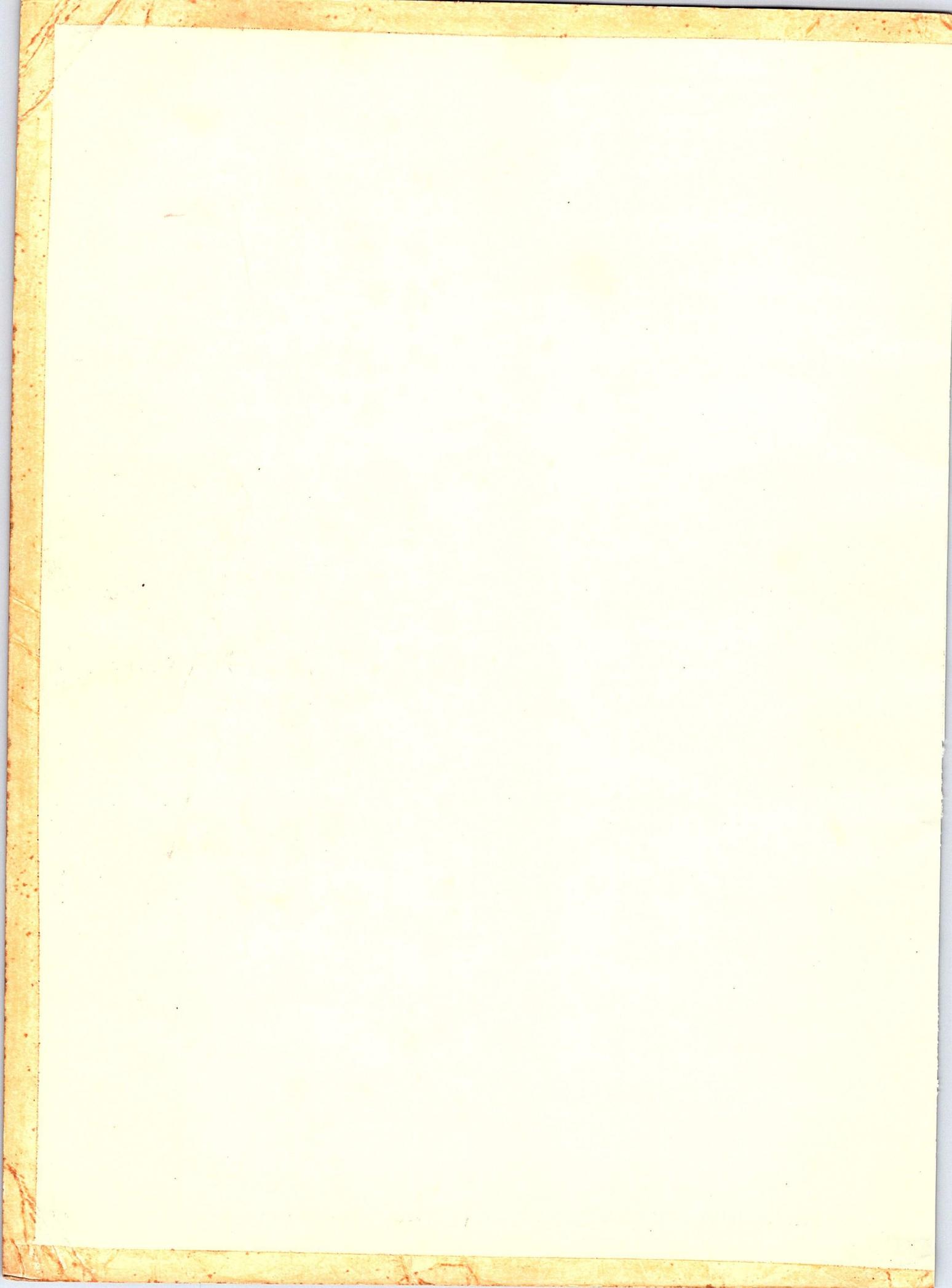


HOW TO WIN AT RACING

By the Editors of DIRT BIKE



HOW TO WIN AT RACING

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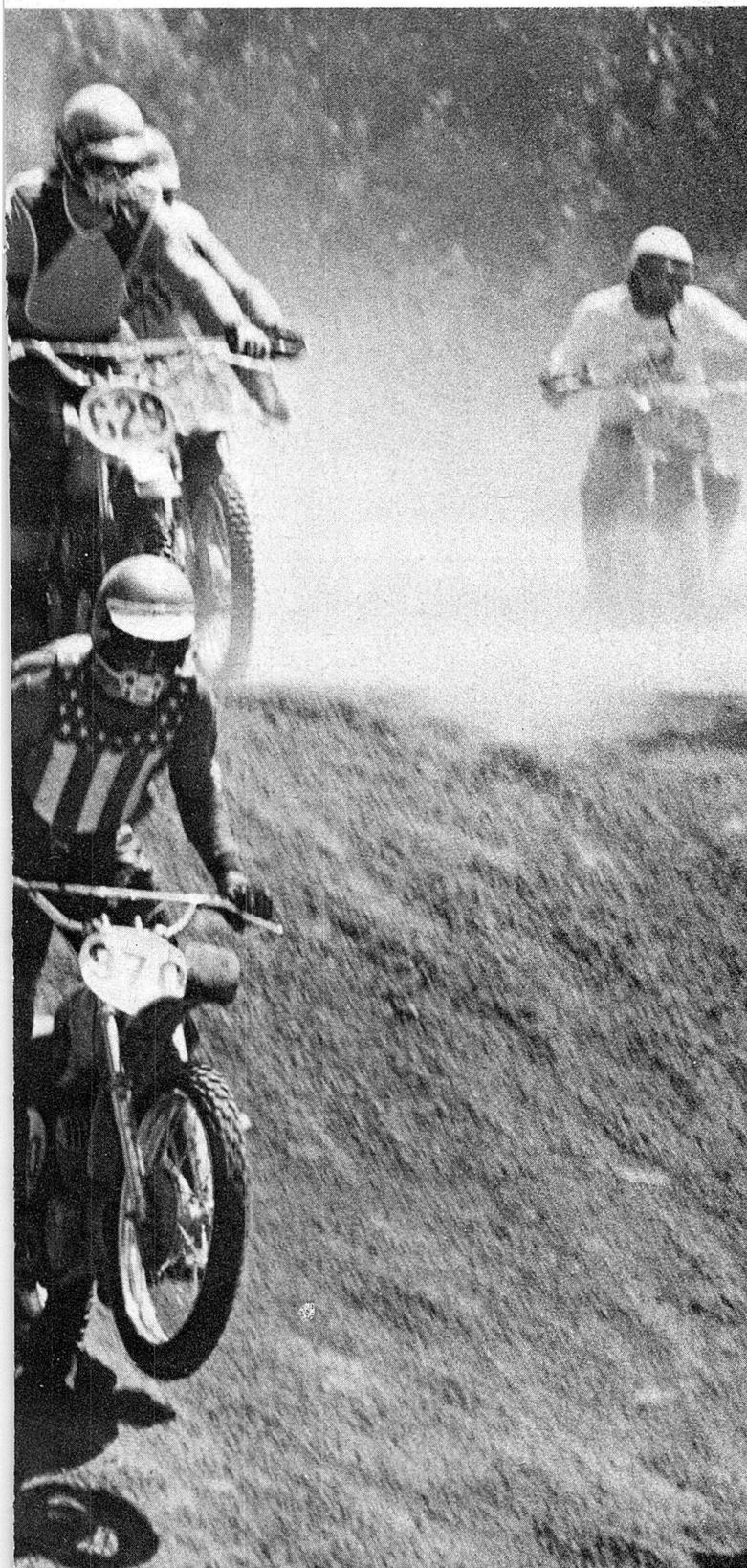
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INTRODUCTION

By the Editors of DIRT BIKE

Did you ever make a mistake — and then regret it for years afterward? Have you ever wondered why the road to being a successful dirt racer was so difficult?



any length of time at all, you'd know they just don't work in the desert. You shoulda bought a . . ."

Yeh. If only you had known. But who is going to tell you all of the facts you need to know? It would probably take you ten years to accumulate everything you must know to be a good racer. If you are lucky enough to buy the right kind of machine for your brand of competition, it's still going to take you a helluva long time to learn those "little secrets" about riding skills.

Sure. "Little" skills. Like cornering. Jumping. Passing. Picking a line. Climbing. And more. The thousand and one items every racer should know, but usually doesn't, unless he's put in a lot of time floundering.

Usually, the guys who learn these skills quickly are fortunate enough to have an older brother, or a friend, or perhaps a job in a competition bike shop. From the ground floor up. And these guys who have an "in" on the know-how are the guys who get to the top fastest. They avoid the stumbling blocks and time-wasting pitfalls that most of us run in to. Their progress is smoother and less hassle-filled.

They always seem to have the winning combination in machines — bikes that work just right for their type of racing. And they always seem to have the fastest bikes in their class, too. No doubt, because they are right on top of the latest hot setup for their scoot.

These "lucky" riders usually seem relaxed and unhurried at the track and are never wandering around looking for parts or tools. They seem to have everything working right, from the moment they unload their bike to the minute they cross the finish line. First. Or damn close to first.

OK, so you know that these guys are winners because they are "insiders," so to speak. They already are masters of information that will take you the next ten years to learn. If you're lucky.

Which brings us to the sole reason for this book. *How To Win At Racing* is designed and intended to give you the information that has heretofore been limited to the "insiders." The guys in the know. The pros. The winners.

Some years back, before DIRT BIKE magazine existed, one of the editors stopped by a shop (which shall remain nameless) and asked a question of the shop owner pertaining to a phase of maintenance that was not covered in the manual. The reply was curt: "Why should I tell you my secrets?"

When we compiled information for this book, the replies to questions were somewhat more pleasant . . . "Oh yeh, DIRT BIKE. Sure, what do you guys want to know? C'mon over, we'll tell you all about the trick things for the 250 Squatty Hummingbird Scrambler."

What you will find here, then, in addition to the technical trickery that has eluded most riders, is a compilation of riding technique facts.

These "how-to-ride" facts were much easier to come by than the technical items, simply because of the people who help make DIRT BIKE what it is today. Our list of Contributing Editors reads like the results column of a Grand Prix. In the Expert Class.

Any questions that needed to be clarified were explained at the tracks, under the eye of the camera. What we didn't know, we found out. And when we did, we put it all down in one book.

And this, my friend, is the book.

Did you buy the wrong kind of machine at one time — and it cost you an arm and a leg to keep running — and you *still* never did worth a damn?

Most of us have made mistakes like this, only to have someone tell us at a later date . . . "Oh, you didn't know that? Well if you've been around *that* bike for

DIFFERENT TYPES OF RACING- AND WHAT KIND OF BIKE IT TAKES TO DO THE JOB



How most of us arrive at the magical moment of being called "racer" would probably make a lot of interesting bench bull sessions. Few people come out flatly and say . . . "Ah'm gonna be a sickle racer." They generally have some preconceived vague notion as to what phase of racing they'll try. But there are phases within phases. Most people pick the one phase or another that suits them best.

What we will attempt to do here is to define clearly the different kinds of dirt racing and — perhaps more importantly — tell you what kind of machine you will need to be competitive in your chosen specialty.

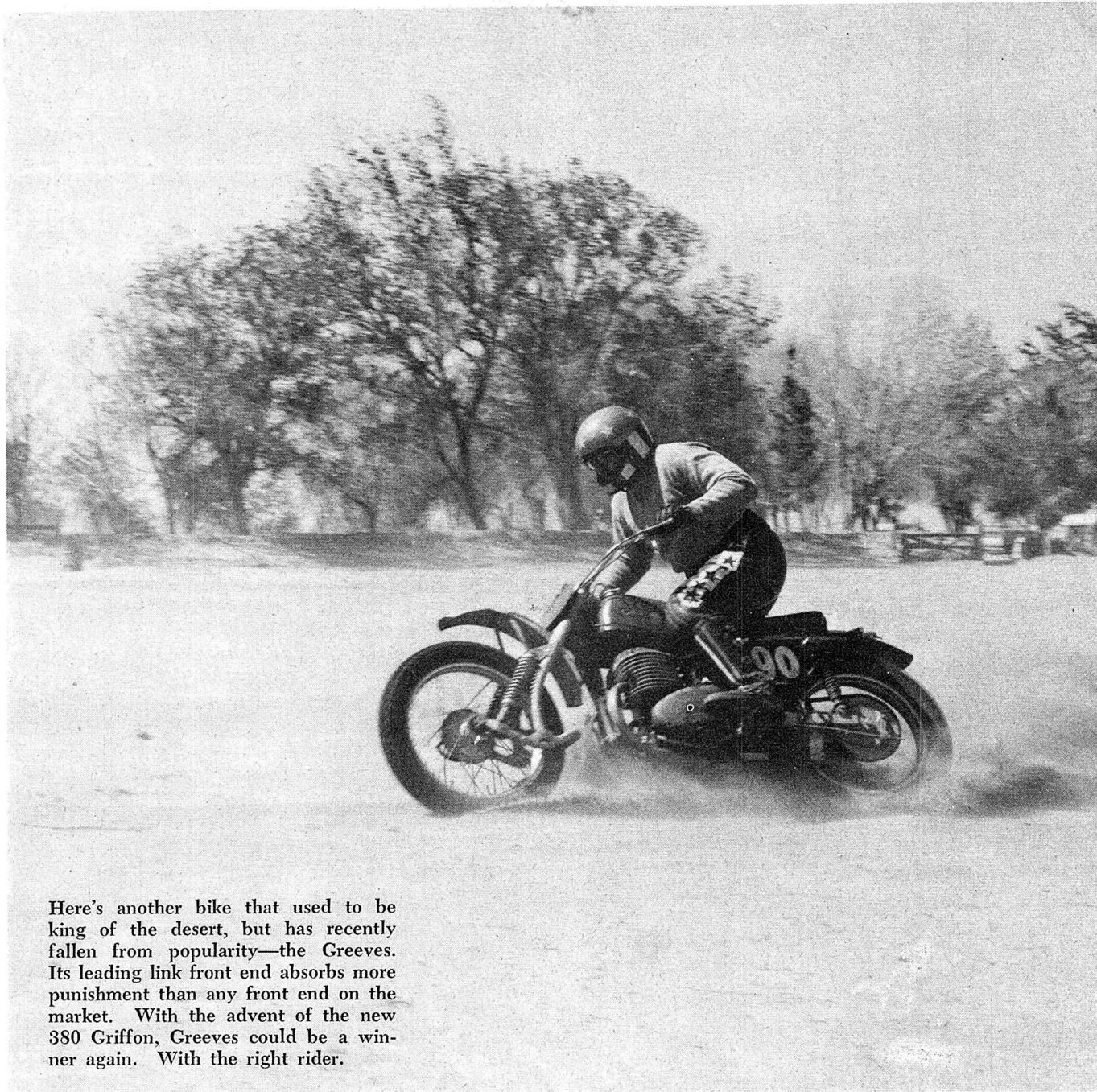
One word of caution: It costs money to maintain one racing machine and a whole lot more for a pair of them. Very few bikes are capable of racing successfully at more than one phase of dirt racing. To learn what bike will do what job, read on.

DESERT AND CROSS-COUNTRY

Probably the most confusing names for races are found in the desert events. Even many competing desert riders find it hard to differentiate between Hare Scrambles, Hare and Hounds, etc.

HARE AND HOUND. A Hare and Hound race can be any distance. The big thing that separates it from

Malcolm Smith has been one of the winningest cross-country racers of all time—on the desert-proven Husky.



Here's another bike that used to be king of the desert, but has recently fallen from popularity—the Greeves. Its leading link front end absorbs more punishment than any front end on the market. With the advent of the new 380 Griffon, Greeves could be a winner again. With the right rider.

the others is that at no time is the same ground gone over more than once. If more than one loop is used (say two 50-milers), the same pit area is used, but each loop is fresh and away from the other.

Some of the Hare and Hound races, like the famous Barstow to Vegas Run, are in a point-to-point layout. This, of course, requires that the rider have a pit crew to gas him up along the way. While this type of event is extremely popular on the West Coast (3,500 entrants in the 1971 Barstow run), it is almost unheard of east of the Mississippi. A huge amount of room is required to hold a decent Hare and Hound, and

there just isn't that much room anywhere else.

Some clubs have held successful H and Hs in a smaller area by condensing them into more and smaller loops. Even out West, three 30-mile loop races are not uncommon. But none of the loops can be over the same charted course.

The kind of a machine best suited to a Hare and Hound is at best a compromise. Above all, the bike must be totally reliable. It's no fun being stuck out 26 miles from nowhere with a busted scooter. The most successful bikes, as of this writing, are the Husqvarnas. Much of their success can be attributed to the fine

field of sponsored riders, but the bikes have proven to be relatively reliable for the privateer also.

A good H and H bike should have a very soft suspension, front and rear, and still not bottom out over the deeper holes. Most of the successful Huskies are running an extended swingarm, generally lengthened $1\frac{1}{2}$ to 2 inches. While the normal-size swingarm works just fine for motocross, the rear end is just too busy for extended periods of cross-country work. Extending the swingarm slows the rear end down and keeps it from hopping from side to side as much as a stocker.

This allows the rider to concen-



Most people are under the assumption you can take a trail bike, like this one, and make a racer out of it. You can, for the price of two race-ready bikes.

trate more on what is in front of him and to plan his lines and approaches a long time ahead.

The big 40-inchers used to dominate the desert events a decade ago, but now aren't even in the picture. Even though Huskies are the kingpins, other brands have done well. A well set-up Bultaco Pursang is hard to beat in the 250 class, and AJS has been coming on strong as of late.

Some machines that have been noticeable by their lack of desert wins have been CZ, Maico, Ossa and a few others. This is not to say that these are not good machines — they have all registered an occasional

win now and then — but they require a great deal more set-up work than those previously mentioned.

A good example comes readily to mind: Bill Bogner started some serious campaigning on his big 400 CZ and even though he was leading and doing well a number of times, he had one disappointing breakdown after another — most of them engine failures. This was very confusing, because CZ enjoys a reputation far and wide as a reliable motorcycle. After much research and much more swearing, the problem was isolated; the Jikov carb was simply running out of gas when the machine was sustained at high rpm for more than

a very few minutes. No gas means no lubrication means one dead engine. While the Jikov worked fine for the off/on requirements of motocross, the demands placed on the ability of the float bowl to retain enough volume in desert riding, would cleanly drain the float bowl dry as the proverbial bone.

The problem, once found, was simple to solve. Make a larger float bowl (volume-wise) or install a different carb, one with more volume built in. Once this was done (along with some frame and suspension mods), Bogner won his first big Hare and Hound.

However, many are not aware of this peculiarity of the CZ, and more than a few shatter those expensive power plants all over the desert. Some riders have enlarged the flow holes in line receptacles, but most opt for a big Mikuni carb, for a number of valid reasons. One of those is improved throttle response and better mileage.

The Greeves used to be a constant winner in the Hare and Hounds of a very few years ago, but little has been heard of it lately. The leading link front suspension has to be experienced to be believed on really rotten ground. Unfortunately, Greeves fell slightly behind in the power department and the rush was on to other brands. Their new 380 is very fast and, in the right hands, could be a winner again. The 250 is still slightly down on power compared to other 250s, but is more than enough for Novices. The ride is absolutely plush and non-tiring.

HARE SCRAMBLES. Hare Scrambles are run over the same type of terrain as Hare and Hounds and the races are very long. The only real difference between the two is that the same ground is used for successive loops.

A normal Hare Scrambles usually consists of two 50-mile loops, although (because of the land squeeze) it is quite common to see three 30-mile loop races as of late. A Hare Scrambles is much easier to set up and control than a Hare and Hound, and is a safer event. The riders will have no surprises awaiting them as they head out after the second loop, or third, depending on the layout.

They also incorporate a smoke bomb and a banner start, and checks are maintained along the course to

prevent course cutting or cheating. Many of the top desert racers prefer to ride Hare and Hounds rather than Hare Scrambles, simply because they run into too much traffic on the second or third loops.

Novices, on the other hand, prefer Hare Scrambles because there are less surprises to be stumbled upon, and they are usually closer to the pits in the event of a breakdown.

The same bikes that work well at Hare and Hounds also work at Hare Scrambles. To be good at any type of cross-country/desert racing, riders develop "tunnel vision." They train themselves to look a great distance ahead and plan their route. When they actually ride over an obstacle, they are barely aware of it, and are considering the next change in line. Needless to say, this takes a great deal of concentration.

EUROPEAN SCRAMBLES. This is a tremendously popular type of desert racing, and is run off by the class, rather than a mass start of all classes. The races are usually an hour long (run on time rather than distance), and the man who is leading at the end of the time period as the finished line is crossed is the winner.

The course is shorter than in the Hare and Hound or Hare Scramble

races, usually 7 to 10 miles long, and the terrain is typical desert. More often than not, the riders are not required to stop at the checks; they are of the "flying check" variety. Dead engine starts are used here, too.

The big safety feature about European Scrambles is that you are never too far from the pits, and if you break down, you can normally walk back in within an hour from the farthest point on the course.

The handicap is, of course, heavy traffic over most of the course. Dust is usually a problem, even for the front runners, once a few laps have passed. The big advantage of riding this type of event is, that *you are allowed to ride the course in its entirety* before the event during the provided practice session. This is usually held rather early in the day, before the first race gets under way.

Races are run off at staggered intervals, allowing a rider to compete in more than one displacement class, if he so desires. A typical example would be:

8:00	100cc NOVICE
9:00	100 to 200cc NOVICE
10:00	0 to 125cc AMATEUR/ EXPERT
11:00	250cc NOVICE
12:00	250cc AMATEUR/ EXPERT, and so forth.

Some clubs have two separate courses in the same general area and run off simultaneous events, allowing everyone plenty of riding with no excessive delays. The Amateurs and Experts run one course exclusively, and the Novices have their own course. European Scrambles are held in different areas of the country, and called by different names.

One popular variation of this is the Eastern Hare Scrambles. The course may only be 4 or 5 miles long, and the winner is determined by time or by laps, or, in some cases where the course is rugged, by either. Example: Two hours or 20 laps, whichever the leader completes first. The name may vary from one section of the country to another.

SCRAMBLES

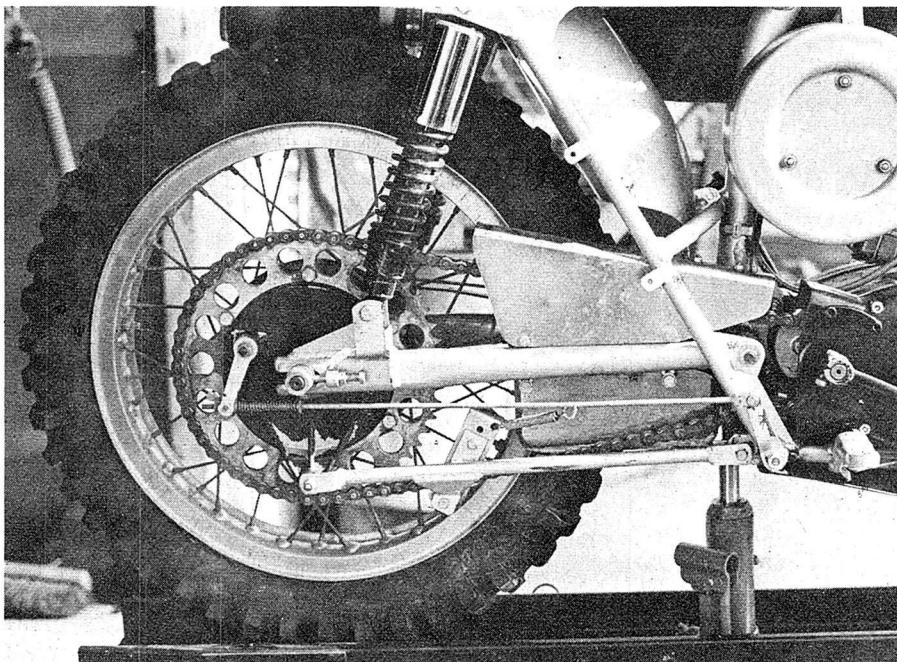
The variations of scrambles are probably the least understood and most misnamed of all the types of racing. Basically, a scrambles track is about a mile or so long in length and has been improved through grading or course smoothing.

It consists of turns, both right- and left-handers and preferably a jump or two, but the course should be free of rocks or mudholes or water hazards. In short, it should be like a motocross course that has been carefully manicured and smoothed out. Most good scrambles tracks have at least one very fast straightaway, where the riders can wind out in top gear. Some are very fast, and the bikes can hit close to 100 mph on a good straight.

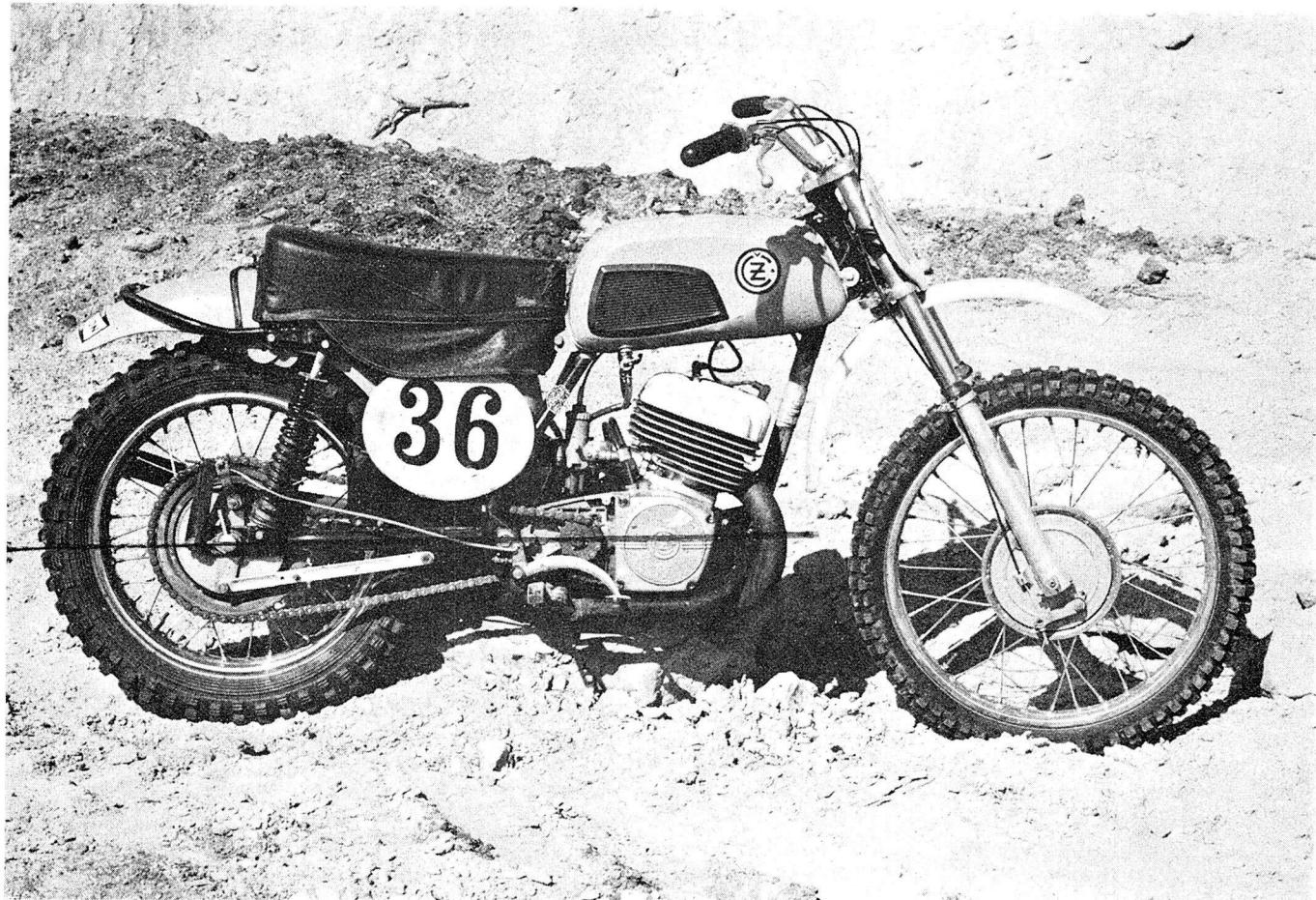
A TT SCRAMBLES is scrambles in its purest form. The track should be smooth enough to use Class "C," or universal tires. A true TT track will not allow the use of knobby tires, because they tear up the smooth track too much.

In this event, horsepower is the way to go. The big 650 four-strokes still do well in the Open class on a smooth TT track, even though the 501 Maico is closing that gate up rapidly. There just aren't that many 501s racing yet.

In the smaller classes, the Spanish bikes, with their all-consuming, high revving, many-horsepower engines totally dominate. You either race a Bultaco, Montesa or an Ossa, or you spend a whole bunch of money modifying a motocross bike. Two of the Spanish firms make bikes specifically for Scrambles: The Bultaco Astro



The Huskies that are doing all the winning are running a lengthened swingarm. The short ones don't get it in the desert, but seem to be OK for MX. The longer swingarm slows down that famous "Husky Hop."



The swingarm on desert and MX bikes should be parallel, or near parallel, as shown on this 380 CZ.

and the Bultaco Pursang America models are fire-breathers right out of the crate. So much so that they are unsuited for any other kind of racing. Ossa also makes the DMR (Dick Mann Replica) which is suited for flattacking and scrambles.

One other bike which is well suited for scrambles is the Maico—once it has received what is known as Stage 3 tuning. This makes the machines totally competitive. The step-by-step procedure is described in the Maico manual for anyone who wants to take their motocrosser and turn it into an eyeball-popping drag racer.

Some machines that are *not* suited for scrambles, and are notable for their lack of success on the smooth tracks, are as follows: Husky, CZ, AJS, Kawasaki, Suzuki, Yamaha and Greeves. However, some of the winners in the Novice classes are doing well on super-potent Yamahas and Suzukis. In the Expert classes, where handling makes the difference, they don't do that well. One notable exception to the Greeves thing is Jim Connolly, DIRT BIKE Contributing

Editor, who won the District 37 Heavyweight Championships on a Greeves 380. However, we are convinced that Jim could also do it on a Vespa, if need be.

IN ORDER TO PICK A GOOD scrambles machine, the following things should be prime consideration factors:

1. SPEED. First and foremost, you must have a fast machine. It does not have to have a great deal of low end torque, and can even be quite peaky. Most of the time, the rider will be in the upper rpm range anyway.

2. HANDLING. A machine with too much rake should be avoided. Most TT tracks lend themselves to sliding, and too much rake tends to lead to front end washout in the turns. Don't buy a bike equipped with knobbies—get one set up with the proper scrambles tires. Most riders prefer a 3.25 or 3.50x19 up front and a 4.00x18 in the rear. Perellis are standard favorites. The machine should have a low seating position, as most of the time is spent seated, rather than standing. A low center

of gravity also instills confidence and makes sliding easier.

3. LIGHTNESS. This ties in closely with handling. The less weight you have to muscle around, the easier your job will be. The riders who still hustle those 40-inchers around get one hell of a workout bending their iron through the corners. They will, however, deny it violently.

4. RELIABILITY. Even though scrambling doesn't last as long (in actual time duration) as motocross, the demands placed on the engine are awesome. Full throttle for minutes on end is just asking for one-piece engines. Don't get the ultimo strung out engines if you are a starter, unless you can afford to maintain it. Their life span is not all that great. Which brings you to . . .

5. PRICE. Ah, yes, the old cost factor. The faster you go, the more the engine blows. It's an old saying, and a true one. The Maico manual, for example, is honest enough to tell you that if you decide to take your engine to Stage 3, you are most assuredly going to shorten the life span considerably.

They also tell you what parts you're going to have to replace frequently. Some manufacturers try to tell you that all is sugar and sweetness with their high performance kits. The rider who insists on tricking out his engine to the nth degree must be prepared to replace vital moving things on a regular basis. Look not only at the initial cost of your TT bike, but at the cost and the quality

of the components you are going to be replacing regularly.

What can you expect to replace during the course of a normal season? A TT bike will run through rear tires like they were free. They ain't. You can also expect to eat up several sets of rings and a like number of pistons. Lower ends have a way of shaking themselves to pieces because of the high revs.

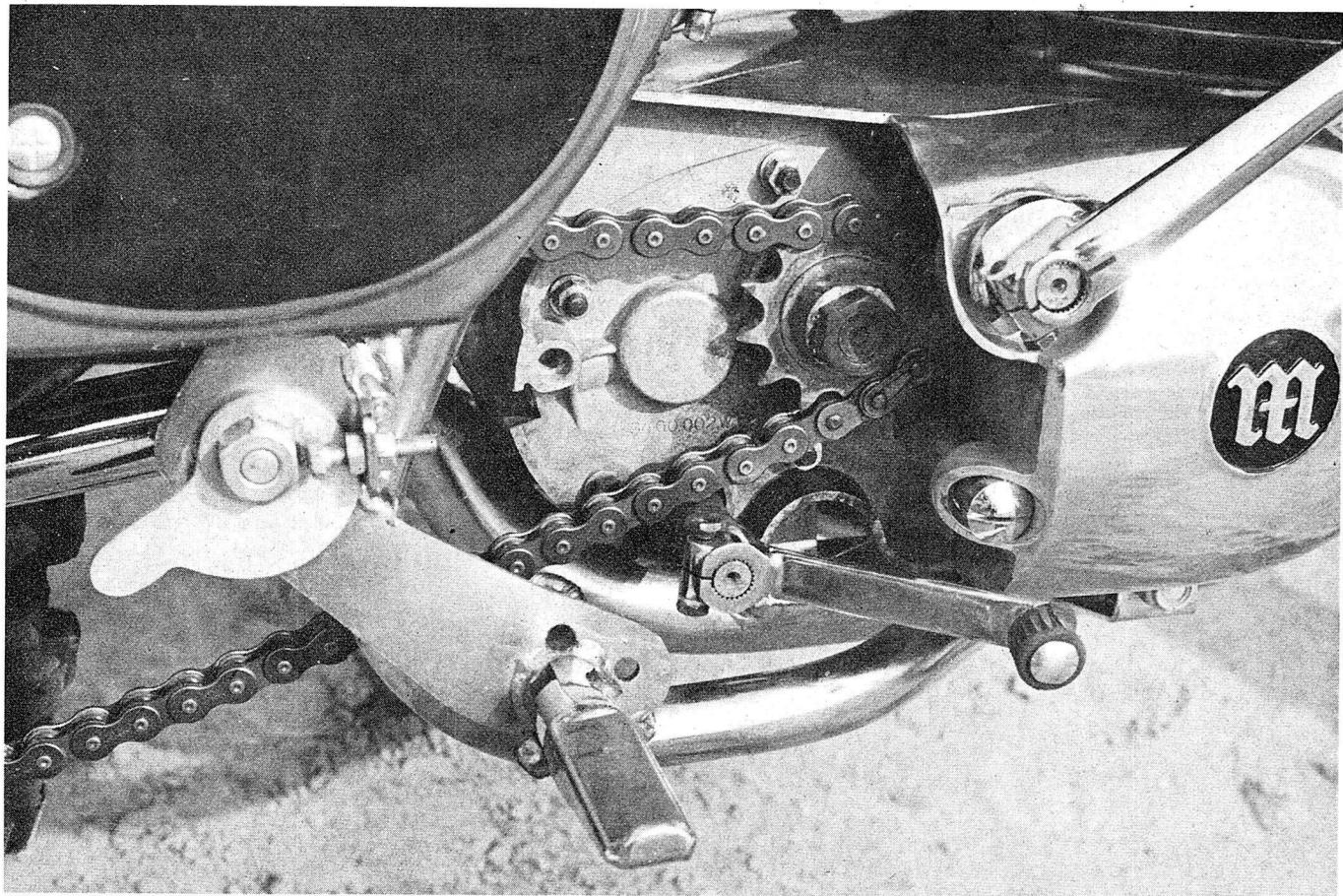
Count on at least one rebuild a year, if you're lucky. Count on three if your luck is normal.

Clutches have a short life span—a longer one if the clutch is all-steel design. Suspension components hold up well, and should not give you much trouble.

Rear wheel spokes and hubs have a way of disintegrating because of the violent churning torque put to



This 360 Yamaha shows part of the reason why Yamahas of this ilk didn't handle. The line indicates an improper swingarm angle, causing the shock to work at a disadvantage. Whenever that shock angle is downward, the rear end tends to pogo slightly or badly, depending on the quality of the rear dampers.



Here's one for your must miss list, the slippery Metisse Montesa footpegs. Get a decent set of pegs instead of junk like this.

as smooth as a pure TT track. Here a motocross machine will usually work as well as a pure TT machine. As long, that is, as it is a fairly hot engine.

SCRAMBLES. More races have been called Scrambles just for the sake of calling the race something. There are plenty of tracks throughout the country that are really nothing more than a straight and a few turns laid out in some farmer's field. So, the promoters bill the race as a Scrambles. This is a good catch-all, but just make sure you know what they mean by the term "scrambles" before you truck your Bultaco America out to East Jesus, only to find a track that looks like the International Six Day Trials.

Call the club, or promoters, and ask for a description of the course—they'll be happy to tell you in glowing terms what it's like. Don't believe all you're told, but at least you can ask them the loaded question . . . "What kind of tires should I run?" That should give you a clue. If they let you run whatever you want, you can bet it'll be closer to a motocross track than

the ground, especially on those tracks with the high speed jumps at the end of the straight.

Your gearbox will also come in for its share of destruction, even though a smooth rider will have few problems in this department.

Surprisingly, electrics give the scrambles rider a great deal of trouble. Probably because the ignition system is operating at near full load most of the time. Many scrambles racers run a total loss system, just to have the ultra-reliability factor on their side.

Vibration is the one thing that all of these high output engines have in common. And the vibration will eventually crack everything from fiberglass to alloy fenders. Rubber mounting these expensive parts is a help, but no total answer exists yet. Take the cost of replacing these parts into consideration when you consider the purchase of a scrambles machine.

ROUGH SCRAMBLES are sort of a cross between motocross and TT Scrambles. The track is usually smoother than an MX track, but not

a scrambles track. In that case, either bring your CZ, or go race somewhere else.

One last thing: Whatever bike you do decide to purchase . . . it's better to buy one already set up than to hop up a trail bike.

MOTOCROSS

This is the most popular form of dirt racing in the country today and the one most people are familiar with. A close look at the rule book (AMA), sheds a little more light on the subject. Even though rules may vary from sanction to sanction, this will give you a good idea of what to expect:

"Protective clothing must be worn. Leather pants or a suitable substitute are required and the boots must cover all the leg exposed by the pants when in any position on the machine. Throttles must be self-closing to the 'dead' engine position. Footrests must be rubber covered or have blunt ends."

"The course should be of 2 miles maximum length and $\frac{5}{8}$ -mile minimum length, and shall consist of 100

percent natural terrain with up and down hills, sand, water crossings, etc. Course should be at least 10 feet wide in all places.

"The course is to be clearly defined about its complete circuit by fence, ribbon, rope, or natural boundaries.

"The starting area shall be separate from the course with at least 100 yards of clear area before the first turn or major narrowing of the course. The starting line must be marked clearly for rider position and must be at least 100 feet wide to accommodate 30 riders in a single

line. A staging line, or area, shall be provided behind the starting line, not less than 20 feet arrears. Starting position is determined by lottery prior to entering the staging area, before each event, except that all pie plate riders must start on the second line.



CZ has a super reputation for being an MX winner, but has done poorly at scrambles and desert.

Maico is an acknowledged super-handling motocross machine—nothing is faster. They can also do a mind snapping job at scrambles if some minimal stage tuning is performed. They haven't concentrated on the desert and have put the emphasis on MX.



"Mail entry and post entry are both acceptable. Mail entry must be postmarked 5 days before the event. Fees are: Mail entry \$3.00, Post Entry \$5.00."

(Editor's note: This will vary from organization to organization but will give you an idea of approximately what it should cost you to compete.)

"Entries in any one moto are limited to 30 riders per mile of course. A rider may not enter more than one division per day per displacement class. In the event of more than 30 entries per class, classes may, at the discretion of the promoting club, be divided. This must be noted on a poster."

"The following must be noted on all posters and advertising: a. Time length for each moto; b. If classes will be split in the event of more than 30 riders per class; c. If sidecars are to be permitted; d. Type of event (professional or European).

"The type of event should be determined as follows: a. Professional type: 2 motos of equal time. Minimum of 25 minutes per moto. b. European type: 3 motos of equal time. Minimum of 15 minutes per moto. c. If riders in any class exceed the course limitations, elimination heats must run with the top riders moving to motos.

"Motocross machines must be equipped with three number plates of oval configuration, approximately 8 inches high by 10 inches wide, of metal or plastic. These must be securely mounted with one on the front forks and one on each side behind the rider's legs with the feet on the footrests."

THESE, THEN, ARE PRETTY MUCH the kinds of rules a rider can expect to find at a normal motocross. They will, as previously stated, vary slightly from place to place, but should run fairly close to these standardized AMA rules.

It should be obvious to anyone who has raced for any length of time that few MX races are run strictly according to these rules. Even many AMA sanctioned events blithely ignore whatever they find inconvenient at the time. Yet, these are very sensible, sane rules that should be adopted by all of the splinter groups across the country.

Scoring a motocross event is a puzzle to many; even most racers don't

know how they arrive at their final placings. Again, the AMA offers a system that works, but is very far from ideal. Their system, for what it's worth, is as follows:

FIRST	400 points
SECOND	300 points
THIRD	225 points
FOURTH	169 points
FIFTH	127 points
SIXTH	95 points
SEVENTH	71 points
EIGHTH	53 points
NINTH	40 points
TENTH	30 points
ELEVENTH	22 points
TWELFTH	17 points
THIRTEENTH	13 points
FOURTEENTH	9 points
FIFTEENTH TO TWENTIETH	1 point

While this system looks good in print, it does not allow for the consistent rider. In other words, a rider who places well up the list in all three motos can lose overall to a rider with two high placings and a Did Not Finish to his credit. Example: Rider A has a first (400 points) and a second (300 points) and a DNF, for a total of 700 points. Rider B, who has finished with three thirds (225 points per ride), ends up with 675 points, placing behind Rider A.

This was brought out rather clearly in the recent Inter-AMA series, where a number of the top Europeans had DNFs and still finished higher than many American riders who placed in all three motos.

Another scoring system currently being used broadly is much more fair to the consistent rider. The system, often referred to as the European system, goes like this:

FIRST	1 point
SECOND	2 points
THIRD	3 points
FOURTH	4 points
FIFTH	5 points
And so forth . . .	

The rider with the *fewest* total points is the winner. Just like in golf. The riders who have one or more DNFs are scored in one of two ways. In Europe, if you DNF, that is it, no matter what you do in the other motos. You just might as well pack up the old van and head for home.

There is a variation which some tracks use; this system allows for a rider with one or more DNFs to his credit. It goes like this: Let's say there are 30 riders in your class and you have some mechanical dif-

DIFFERENT TYPES OF RACING

iculties, causing one DNF, in your third moto. In the first two motos, you finished first and first. Your total points for the day would be 32, at least allowing you to place relatively high because of your first two rides.

EQUIPMENT FOR MOTOCROSS

First and foremost, naturally, is your choice of machines. There can be no argument that the most successful bikes, as of this writing, are Husqvarna, CZ and Maico. To be sure, Suzuki dominated the world title chase in a rather heavy fashion, but the bike they offer is a world apart from the machine Joel Robert pilots.

You will probably have to do fewer modifications to one of the three bikes listed above, than with most other mounts available to the private rider.

To be sure, you can make almost anything competitive, but you will probably end up with a great deal of time and money spent to accomplish the same end.

The mounts that are relatively "ready" are as follows: Husky, CZ, Maico, AJS, Ossa, Montesa, Bultaco, Greeves. One must also consider the new Yamaha MXers and a few other models that are just coming in on the scene. Of the above, the Bultaco and Montesa are more suited to the smoother, faster tracks than to motocross, advertising notwithstanding. The Greeves is slightly more suited to desert and the remaining Japanese MXers are not really sorted out in the handling department yet.

This does not take into account the models available in the popular 125 class. Here, the choice is staggering and more than two dozen models are on the market. Prices for these mounts range from around 400 bucks, to well over \$1,000 for some of the more exotic types of European hardware.

There are a number of things that you will want in a totally competitive motocross machine. Good handling must come at the top of the list, followed in short order by good power, reliability and light weight.

GOOD HANDLING

A competitive MXer should handle a hair on the quick side, because very high speeds are rarely attained on a true MX course. Speeds attained will range from creepy-crawly corners taken at 10 miles per

hour, to fast turns taken at 40, to an occasional straight, where the rider might momentarily reach 60 to 65 mph.

Most of the time, the rider will be changing direction, and for this he'll need steering that responds quickly. However, *too-quick steering* is not desirable, for some genuinely rough ground must be covered, and the machine must have some inherent stability.

Most of the successful MX machines today are running approximately a 55-inch wheelbase and anywhere from 30 to 33 degrees rake in the front end. This must be combined with a low center of gravity. Huge amounts of ground clearance are *not needed* on an MX bike — 6 inches is plenty.

Ideally, the center of the crank should be even, or lower, than a line drawn between the front and rear axles. See Figure A. Using this as a reference guide, you can eliminate many bikes from your list of potentials, simply because they have the wrong kind of center of gravity for motocross.

You can determine where the center of the crank is without splitting the cases (something most new bike dealers would heartily disapprove of on their showroom floor), by simply determining where the flywheel magneto is. The mag is normally hooked right on one end of the crankshaft — a quick look tells you instantly where the magic spot is.

Other things you must look for in a good motocrosser are, in no particular order, the following:

1. Good fork travel. At least 6 inches with two-way damping.

2. A parallel, or close to parallel, swingarm angle is desirable. See photos. A swingarm that points slightly or heavily downward, tends to "pogo" the rear end.

3. Good power. This is more important than just pure power. A pipey machine is a real bear to ride. The machine should have at least a 3,000 rpm spread of usable power. If the engine really only pulls in a narrow 1,500-2,000 rpm range, much time will be lost in stirring through the gearbox.

4. A narrow bike, especially at the tank/seat juncture. The tank should also be narrow enough to permit the rider to slide forward for effective weight transfer. Sharp edges on the tank and seat will

irritate the rider and make him overly conscious of the discomfort, distracting him from the task at hand.

5. Good footpegs and controls — ones that can be easily reached. It often gets sloppy on an MX track, and the rider will need something that will assist in keeping a slippery boot where it belongs. A prime example of a good peg are those found on the late Bultacos. A prime example of a bad peg are those found on the Metisse-framed machines.

The other controls should be re-bendable, 'cause you're going to lay that bike down sure as hell at one time or another. Why pay for broken controls?

6. Durability of hardware and components. Plastic fenders are the way to go, if they are of the flexible variety. Avoid purchasing a machine with a paper-thin glass gas tank. If an easy crash doesn't wipe the expensive tank out, then vibration will over a long enough period of time.

bikes have superb electrics. Anything with the word LUCAS on it in the spark department should be avoided like a leper colony. We say this not with malice, but with candor, based on past experiences with many of Joseph Lucas's adventurous products.

10. A modern carburetion and filtering system. This means a still air box and a carb with a wide range of adjustments. Mikuni, Bing, IRZ are good carbs, when properly jetted. You know what we think about Amal, so we won't belabor that point any longer.

11. Real knobbies. Good rubber is a must and trials tires aren't going to do the job. If they work good for you, then you're riding something other than motocross.

12. A strong, light frame. With correct geometry. 'Nuff said.

13. Fluid integrity. Preferably a non-leaker, both in fork seals and engine components. Also gas caps.

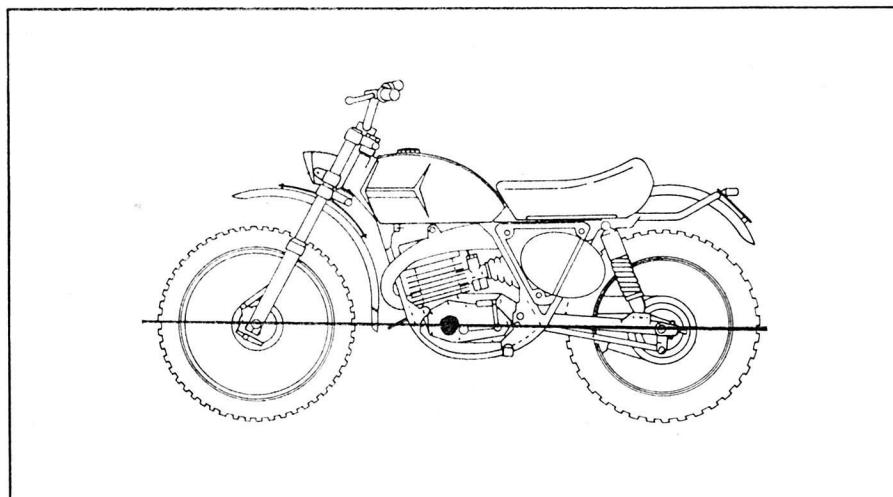


FIGURE A

7. Ease of maintenance. Take a hard look at the machine from a serviceability standpoint. Is the air cleaner a bitch to get to? Do you need special tools to perform simple functions like timing — or pulling a clutch? A serious racer will do much of his own work and the easier the better.

8. Good rear shocks, preferably ones that are rebuildable. Girling are good, but not rebuildable. Ceranis, Konis, Mavericks and a few others are rebuildable. This can save you many bucks over the long run, because you will wear out the finest shock eventually.

9. Good electrics. The Japanese

14. Fasteners. Look for the presence of aircraft-type locking nuts. The more the better. Greeves makes liberal use of these, and so does Kawasaki. Most other bikes don't. It sounds like a small thing, but it's nice to have things stay on the bike. Especially at speed.

15. A good feel. If the bike doesn't feel "right" to you, then all of the above virtues don't mean a thing. Sit on the bike; ride it. If it instills confidence, then that is the correct machine for you. Just make sure that as many of the things to look for are there. It'll make your racing life a lot more agreeable.

16. Price. This is often the deter-



Mighty Steve Rigen sticks out his tongue at the mention of anything other than Bultaco. No greater Bul' Freak ever walked the earth. His Astro represents what you have to beat to win at scrambles. Nearly 40 horsepower out of a 250 single makes the bike a healthy handful.

mining factor. But more than the initial price, consider what it will actually cost to make the machine "race ready." A \$900 bargain may not really be a bargain, if you have to sink another \$300 to \$400 in to make the machine competitive. You are really better off purchasing a one-year-old Husky, CZ or Maico that is in decent shape, than a so-called trail bike at a bargain price. By the time you make the trail bike competitive, you will have spent the same bucks as a new CZ. And when resale time comes, you'll play hell getting normal book price for a "tampered with" trail bike. The race machine, on the other hand, will de-

preciate normally, and that's all.

No matter what kind of racing you get into, make your decision early — get a racer that is as ready as possible, rather than trying to make a racer out of one of the dual purpose bikes. If you have a dual purpose bike, and that's all you can afford, then ride it as it is.

Ride it to learn skills, and don't waste a lot of money trying to make a jewel out of it. You won't win with it, but you'll have a lot of fun. And in the interim, you can save your money for the race machine that *will* do the job.

Then when it comes time to buy, your dual purpose machine can be

sold for a more or less normal price. If you've spent a small fortune on trying to make a racer out of it, you'll lose every penny you sank into the machine, and it'll sell for less than a stock trail bike of the same type.

Decide on one or another type of racing, and try to get the right machine to go with it. Face up to the fact that there is no one single machine that will do everything right out of the crate.

Still, most bikes can do a reasonable job at most types of racing. The big difference is, however, whether you want to just enjoy yourself and do a reasonable job, or be a winner. Winners specialize.

RACING RULES AND REGULATIONS

Like any other sport in the world today, there are certain rules that apply to motorcycle racing. While these rules vary from area to area, the following rules are a very good general guide and are taken, in part, from the AMA Rulebook.

CAUSES FOR DISQUALIFICATION

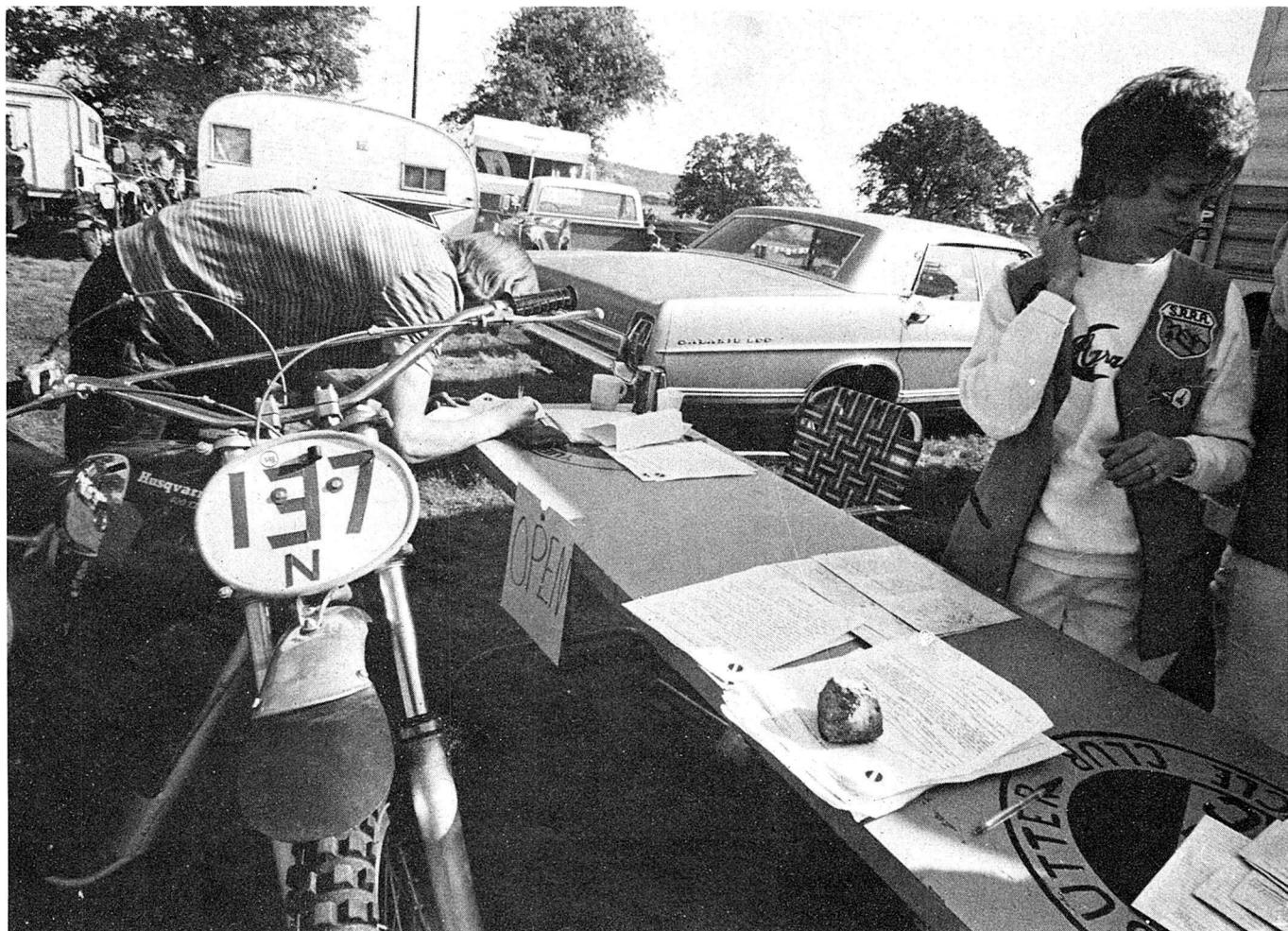
Under penalty of disqualification, no motorcycle shall be used by more than one contestant in any specified day's program. Sole exception is limited to use in the

powder puff class, where a woman may share a man's motorcycle.

No rider is permitted to qualify more than one motorcycle for any meet, except when such a meet includes events requiring equipment of different displacement classification.

A rider cannot enter and ride the same motorcycle in more than one class or classification.

No one, except riders officially entered, may ride or practice on any race course on the day of the event.



No rider is permitted to ride on any course after the completion of the event.

EVENTS

A sweepstake event may run in trail bike lightweight and heavyweight division, but shall not pay points. AMA-approved helmets must be worn. Protective leather clothing is recommended, but not required.

Only standard pump gasoline may be used, without any power additives.

BREAKDOWN OF CLASSES

Six entries will be required to constitute a class. If there are less than six entries, they shall compete in the next larger displacement class. Experts shall ride with experts, except in the 55, 100, 125 and 175cc classes. These classes shall run the experts and amateurs together, whenever possible, and handicap the experts.

Lightweight machines shall run on an inch-for-inch basis. Lightweight classes shall be 0 to 55, 56 to 100, 101 to 125, 126 to 175, 176 to 200, and 201 to 250cc.

Heavyweight machines shall be as follows: 251 to 350, 351 to 500, 501cc and over.

EQUIPMENT LIMITS

Equipment shall be limited to manufacturer's standard models as cataloged with standard engine for that model, allowing reborning up to 80 thousandths of an inch oversize. Motorcycles with smaller displacement than the displacement class they must compete in (example: 305cc must compete in the 350 class) may be increased in displacement up to the maximum for that class. Removal of numbers or letters from the machine that identify model or displacement, shall be reason for prohibiting that machine from competing.

No lightweight machine can compete in the heavyweight division at any time.

PROTESTS

All protests, whether of rider, machine or rule violation, must be clearly stated in writing and must be accompanied by a protest fee of \$10. (This too will vary from sanction to sanction) and must be presented to the referee or acting referee of the club promoting the event not later than 30 minutes following the termination of the event in question. If the protest is found to be valid, the protest fee will be returned to the person making the protest. If the protest is not found valid, the protest fee will be forfeited and given to the person protested.

POWDER PUFF

The powder puff class is limited to 125cc displacement. An entrant may not compete in another 100cc or 125cc event at that meet. Powder puff class at Grand Prix events shall run a combined 100cc and 125cc class, but shall be scored separately.

AGE LIMITATIONS

No person under 21 years of age shall be permitted to compete in any sporting event without having a notarized statement of release by parent or guardian on file with the Sports Committee. (Editor's note: Even though such organizations as CMC and ACA may not have a Sports Committee, they too require that a person

under 21 years of age shall have a notarized statement of release by the parent or guardian, generally with the rider at all times.)

ADDITIONAL CAUSES FOR DISQUALIFICATION

At the promoting club's discretion, any motorcycle or rider can be eliminated from competition for reasons of being hazardous to riders or spectators. (Editor's note: This means the pit racers too.)

The Competition Committee shall have the power to disqualify for the day or suspend any rider for cause, up to the balance of the calendar year and/or penalize any rider up to 50 percent of the points he has earned for infraction of any rules of the Sports Committee, a promoting club, or common sense safety procedure.

CLOSED COURSE RULES

Lightweight and heavyweight machines cannot be run concurrently on any closed course.

The following rules apply to heat race events. Heat race events can be used in scrambles, rough scrambles or even in motocross at the discretion of the promoting club.

Motorcycle equipment used in time trials for qualifying heat must be used in the final event. (Editor's note: What this means is that the motorcycle you're qualifying is the one you must race — you can't switch bikes in midstream.)

Folding footpegs and ball-ended control levers are required in scrambles-type events. Exceptions may be made for events paying multiple points. (Editor's note: This rule has been relaxed.)

Under no circumstances may a contestant reenter an event in the same class after failing to qualify in his regular heat race. (Editor's note: What this means is, if you don't make the main, or the semi, in your heat race then that's it — pack up.)

STARTING LINE

The starting area will have two lined lines. The starting line and the penalty line. The first is the starting line. Anyone crossing this line before the starting flag or signal has been given will be put on the second, or penalty, line. If the rider crosses the penalty line before the signal is given, he will be placed with the rear wheel on the penalty line with the motorcycle facing in the opposite direction from the start.

Normally, the penalty line shall be 30 feet behind the starting line. (Editor's note: If the rider attempts to cheat after he's placed back there, more often than not he will be disqualified from the event. This is not at all uncommon.)

RESTART

If two or more riders fall before or in the first turn, the event shall be black flagged and restarted if the fallen riders interfere with the normal progress of the start. (Editor's note: This holds true more for Rough Scrambles and TT Scrambles than other events. It takes a very severe multiple crash to cause a restart in motocross races.)

Heat races shall be run to determine the qualifier for the main event.

HANDICAP SYSTEM

The promoting club shall regulate handicap events

HOW TO WIN AT RACING

according to the size of the track. At no time should a rider be advanced more than 100 feet ahead or less than 50 feet.

SURPLUS ENTRIES

The motocross system may be used should there not be enough entries in a class to warrant heats in a main event. This simply means that the same riders run three separate heats. A rider will receive no points in a heat he fails to finish.

PRACTICE RULES

Some additional rules apply to specific types of racing. For example, practice in the lightweight division in scrambles shall be divided into two separate sessions — the 0 to 125cc will practice by themselves, and the 126cc to 250cc will also practice by themselves.

DESERT EVENTS

The rules applying to desert events are as follows: Contestants found practicing on a marked desert course



prior to or during the running of an event shall be disqualified for the day.

SMOKE BOMB LAWS

The area from the starting line to the smoke bomb is not part of the marked course and may be scouted before the starting time. The marked course begins at the smoke bomb and may not be scouted before the starting time. Contestants should pick up the course at the smoke bomb and remain on course thereafter. Any

rider obviously off course will be subject to disqualification. (Editor's note: What this means to the rider is that he can, before the actual start of the event, ride to and from the smoke bomb as many times as he sees fit, as long as he does not interfere with any event in progress. It is a good idea for a rider to familiarize himself with the terrain between the starting line and the smoke bomb.)

CHECKPOINTS

All riders must remain on course and approach the





checks from the proper direction. (Editor's note: This means if you pass up a check and see it behind you, you must enter the check from the original intended direction — simply coming into the check from the wrong direction can cause disqualification.

STARTS

All mass start-type events will be started by the promoting club at their discretion when all the engines on the line are dead, by the dropping of a banner. The

banner must be up by at least one minute before it can be dropped. Any live engines will be disqualified.

Any rider starting and leaving the line before the banner is dropped shall be disqualified, and the remainder of the riders will have lap check cards checked as soon as possible; then the banner will be dropped for the only legal starters. (Editor's note: Most clubs stamp the card on the rider's tank, or put a sticker on the number plate, or use some device of this nature only a few minutes before the race, to clearly identify that all



riders on the line are truly there and not out on the course cheating.)

Any club starting a Hare and Hound, Hare Scrambles or European Scrambles must use the banner start.

RIDERS' MEETING

There shall be a riders' meeting prior to the start of each event. Comprehensive printed instructions may be made available to all entrants in lieu of a riders' meeting. This is mandatory. (Editor's note: Most effi-

cient and successful clubs do both — have a riders' meeting and a printed sheet.)

Each contestant must have his lap check card prior to the start of each event.

STAGGERED STARTS

All novices shall start in the second line after the amateur-expert start with at least a 15-minute delay after the first line leaves. No rider on the second line will receive a starting mark until after the first line has started.

250 INT Rawhide 1-23-72

NAME	NO.	CLASS	MACHINE	DATE								LAP SCORE
				1	2	3	4	5	6	7	8	
1. E. Sykes	91	Ma1										400
2. R. Pinnick	410	CZ		1	300	9		310	6			300
3. T. Schafer	445	CZ										225
4. K. Schmidt	497	CZ										225
5. G. Messick	398	Ma1										169
6. A. May	378	CZ		2	0	5	7	23				127
7. B. Gray	88	Bul		95	225	127	447	2				95
8. R. Blanton	255	Bul		4	7	53	64	14				71
9. T. Kuykendall	441	CZ		225	0	0	225	9				53
10. D. Carlson	348	CZ		300	40	95	435	3				40
11. R. Benson	272	CZ		5	22	30	57	16				30
12. M. Widgery	151	CZ		71	95	71	237	8				23
13. T. Cale	336	Ric										17
14. J. Isitt	81A	Hus		40	0	0	40	18				13
15. F. Munoz	275	Mon		22	169	0	191	11				7
16. R. Lester	688	Oss		13	13	0	26	20				5
17. L. McCarty	860	Bul		400	400	300	400	1				4
18. R. Boozell	80	CZ		127	3	13	143	12				3
19. S. Sutter	290	Ma1		1	4	4	9	21				2
20. B. Henderson	974	Yam		30	9	169	208	10				1
21. D. Barnett	302	CZ		17	17	0	34	19				
22. M. Loftus	830	CZ		53	53	225	331	5				
23. E. Armstrong	268	Hus		1	0	7	8	22				
24. R. Fagan	605	Ma1		1	127	0	128	13				
25. T. Battenschlag	11A	Ric		1	0	400	401	4				
26. R. Davidae	9T	Ric		169	71	17	257	7				
27. J. Phillips	428	Hus		3	2	0	5	24				
28. D. Clark	100	Oss		1	1	0	2	25				
29. J. Harriott	286	CZ		9	30	22	61	15				
30. D. Shumate	3B	CZ										
31. C. FORBES	249	Ma1C		7	5	40	52	17				
32.												

(25)

A typical scoring sheet used at a CMC motocross. This is the final tally on the 250 Intermediate class at Rawhide Park. The CMC uses the AMA scoring system which awards 400 points for 1st place as listed on the right side of the page.

novice, amateur and expert. A rider registering for the first time in this division shall be classed as novice, unless in the opinion of the Competition Committee he should be classed higher. (Editor's note: Generally based on past performances.)

RECLASSIFICATION

A rider may be reclassified at the discretion of the Competition Committee.

A rider may petition the Competition Committee to be reclassified.

A rider who attained Expert status on a heavyweight machine or machines will be classed as an Expert in the Lightweight Division.

Whenever a lightweight rider has attained Expert status, he will be classed at least as an Amateur in the Heavyweight Division.

When a rider has attained Expert status in the Scrambles Division, he shall be classed at least as an Amateur in the Desert Division.

When a rider has attained Expert status in a Desert Division, he shall be classed at least as an Amateur in the Scrambles Division.

A rider with an Amateur or higher classification in either Desert or Scrambles Division may not hold a Novice Classification in the other.

Classification in the Motocross Division will be equal to the next classification lower in the highest classification in either of the other divisions.

POINTS FOR CLASS ADVANCEMENT

A rider may receive points in only one class of a division in a day's program.

Should an event pay scrambles and motocross or desert points, a rider shall enter in his highest classification. (Editor's note: It is usually at the option of the rider at a Grand Prix as to where his points should be applied — desert, motocross or scrambles.)

No rider may enter or compete in a class higher than his assigned classification.

RECOGNIZED CLASSES

The following are the only classes recognized nationwide as of this writing:

1. Ultra Lightweight Scrambles.
2. Light Scrambles.
3. Heavyweight Scrambles.
4. Trail Bike Desert.
5. Lightweight Desert.
6. Heavyweight Desert.
7. Motocross.
8. Side-hacks.

THE ABOVE RULES ARE intended as a guideline and by no means are they absolute and final down to the last word. These will vary slightly from place to place but, in general, are a very substantial, solid guideline.

To find out what variations on these rules may exist in your area, write to the American Motorcycle Association, Worthington, Ohio. They will, upon request, supply you with rules for each and every district in the country. Most of the so-called outlaw organizations pattern their rules rather closely after the AMA rules. Get a copy of the rules in your area. Read them and learn them.



Hand on helmet and in-gear starts cause more breeches of conduct than any other facet of bike racing. Penalties and disqualifications often occur when riders try to psych the starter or over-anticipate his moves. Anxiousness and cheating are two different things, and officials can tell the difference.

DETERMINING FINISHING POSITION

Finishing position is determined by the order of finish at a predetermined point, in case a rider misses a legal check for purposes of determining finishing position.

Desert courses shall provide a 50-foot wide lane through pit and spectator areas wherever feasible. If not feasible, pit and spectator areas should be confined to one side of the course.

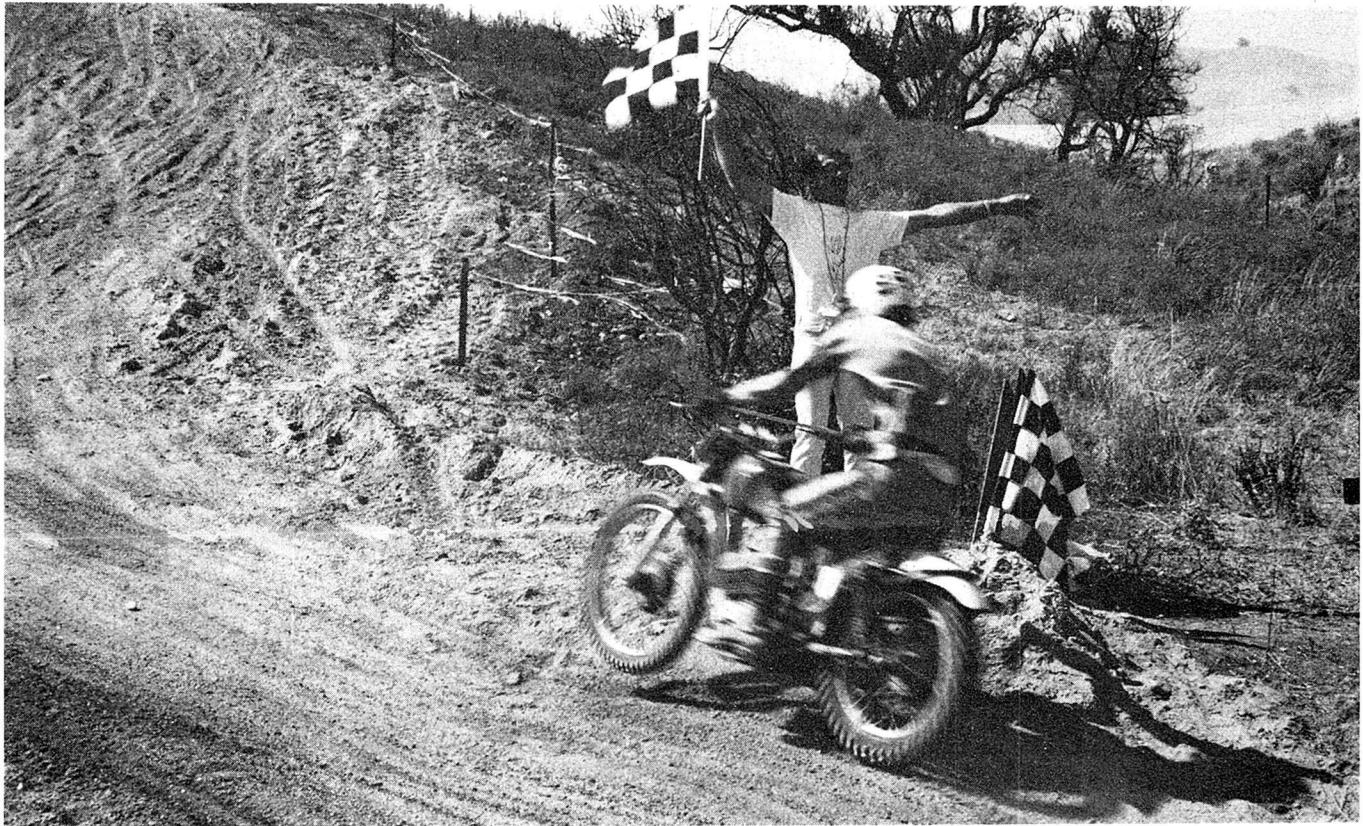
RIDER CLASSIFICATION

A very important part of competition rules is, of course, how riders are classified. Rider classification is relatively simple and, as it is set up now, seems eminently fair.

Riders registering in the lightweight division for the first time, will be classified by the Competition Committee. In the trail bike class, classifications will be expert, amateur and novice.

In the heavyweight division, riders will be classed as

WHERE TO GET YOUR RACING CARDS



Even though you'll find dirt racing all over the country, certain areas are hotbeds of activity. California leads the nation in sheer numbers of participants, followed closely by the Ohio area. Texas, Florida, most of the Southern states and the Northwest Washington/Oregon area also have a good following. Pennsylvania and Maryland are big in hillclimbing and scrambles, and the Michigan/Illinois sector is enduro country, with a good deal of interest in motocross and scrambles.

The AMA is the Big Brother of Bike Racing in this country, and they have arbitrarily divided the entire U.S.A. up into sections, or Districts, as they call them.

Each of these Districts has its own Sports Committee and makes the local regulations that govern racing in its area. Of course, they must follow the guidelines set down by the boys in Worthington.

At many times in the past, these Districts have fought bitterly with the head AMA office, and some have withdrawn to form their own outlaw (AMA terminology) organizations. Not all of the Districts are race-oriented. Some are road riding freaks, delighting in poker runs, rallies and other trivia of that nature. These are usually the clubs that run around in full dressers with the Harley hats perched jauntily on their matching pseudo-traffic-cop outfits. This, fellow dirt rider, is not the stuff we are looking for. All these people do is bench racing and TT racing (Tavern to Tavern).

There are 13 Districts that *are* racing oriented, and they control 90 percent of the racing held in this country. If you write to these people, they can tell you what you must do to race, and will send you all the forms to fill out and, if they are on the ball, will send you a

schedule of all the sanctioned events for the calendar year.

Before you send off to them for the info, send \$7 off to the AMA at this address:

American Motorcycle Association
P.O. Box 231
Worthington, Ohio 43085

Be sure to include all the necessary poop, like your name, address and zip.

Don't expect fast service. They have a way of taking what seems like forever to respond to the simplest request. But be patient—you'll eventually get it.

The card is good for one year and entitles you to buy another card—this one for the District you live and compete in. You must have both. The District card will probably set you back a deuce, but they usually reply quickly.

Part of the AMA fee includes an insurance plan that isn't all that bad. Look into it. They also try to get you to subscribe to the AMA monthly magazine, which is staggering in its ability to bore you to sleep.

It's filled with fun pictures of guys who have been officers of something or another for 40 years, or the same old shots of Mert Lawwill skidding his Harley around someone else's Harley.

On second thought, you might order one copy . . . this will enable you to see what they all look like. Better yet, save the money for a couple quarts of your favorite racing oil.

When you order your District card, you must stipulate what type of racing you are going to participate in. Most offer a motocross card, a scrambles card and a desert card. Some Districts offer an exclusive enduro card, or a cross-country classification of one sort or another. You must get a separate card for each and every type of racing you decide to enter.

If you hit your first race without a District card, you will probably have to enter as a "pie-plate-expert."

The sign-up people will give a pie plate with an assigned number on it, good only for that day's riding. And you must ride in the Expert class in your engine displacement size. This is done to discourage cherry-pickers and non-members from riding. If you have a desert card, for example, and desire to ride a motocross event, you will be allowed, but will receive no points for the ride. The following AMA Districts have racing organizations. The names and addresses are of the district racing coordinators.

District 2: Don Pink
298 Concord
Yonkers, New York 10710
District 4: Paul Cole
Box 23
Port Gibson, New York
District 5: Pete Zepka
1275 Frankstown Rd.
Johnstown, Pennsylvania 15902
District 6: Dorothy Vanino
611 Wyomissing
Wyomissing, Pennsylvania 19610
District 7: James Kearney
13 Highland
Glen Burnie, Maryland 21061

District 15: Robert Humphrey
2025 E. 46th Street
Indianapolis, Indiana 46205
District 17: Bill Maxey
1148 Cedar
Rockford, Illinois 61102
District 23: Bernard Lawson
Rt. 3 Box 331
Cambridge, Mississippi 55008
District 27: Robert Selden
10219 Barnes Lane
Tacoma, Washington 98444
District 35: Albert Owen
P.O. Box 296
Madera, California 93737
District 36: John Ramos
P.O. Box B111
Ceres, California 95307
District 37: Bill Adams
814 Cobb
Placentia, California 92670
District 38: Floyd Emde
4140 Acacia
Bonita, California

California has an abundance of racing organizations; here are some of them:

CMC
P.O. Box 1402
Costa Mesa, California 92629

USMRC
P.O. Box 1027
Pomona, California 91769

ACA
106 North Claudia, Suite 312
Anaheim, California 92805

SRA
P.O. Box 3882
Torrance, California 90510
Phone numbers: (213) 370-8234 and (714) 735-4641

ACE
Box 174
Newhall, California 91321

AMERICAN MOTOCROSS CLUB
P.O. Box 663
El Toro, California 92630

To find the organizations in your area, your best bet is to pick up on one of the weekly bike papers, *Cycle News* (which is broken down into regions), *Motorcycle Weekly*, *Cycle Scene West* and the monthly magazine, *Cycle Sport*. These publications have more listings of races than you will believe, if you have never seen them before. They are usually found at competition-oriented bike shops. The price is around 30 cents for the weeklys and is a bargain for the information contained.

That's it—just pick the kind of riding that appeals to you, fire off a letter to the right people, part with a few bucks, and buddy, you are a racer. At least on paper.

WHAT DOES IT REALLY COST TO GO RACING?



Obviously, it is going to cost you a little more than a motorcycle and a helmet to compete regularly in racing. What you can expect is a more or less normal entry fee for the different types of racing. The only truly national standardized system is AMA's. There are, of course, other sanctions throughout the country, such as CMC, ACA, ACE etc. But the AMA stretches throughout our country, and they have established what have now become more or less standard prices for the different types of racing. Here is what you can expect to pay for entry fees:

The entry fee for a Hare and Hound Race can't be more than \$4. Sometimes it will be less, but normally a rider can expect to pay \$4.

Entry fees for Hare Scrambles or the European Scrambles cannot exceed \$3. Very rarely will you find a race that will charge you less.

Rough Scrambles and TT Scrambles also cannot exceed \$3. This must include admission for the rider. Some non-AMA events gouge the rider rather neatly by charging him a \$3 to \$5 entry fee, plus admission to get into the racetrack.

Entry fee for Motocross is not supposed to exceed \$3 for a mail entry. However, a rider can expect to pay \$5 for a post entry. This too is supposed to include entry for the rider, but it is entirely up to the discretion of the club, which quite often must make special arrangements with one motorcycle park or another for use of the track. Generally, this should be clearly stated on the poster or pre-race advertising in your local cycle weeklies.

Grand Prix events, such as the famous Viewfinders' Grand Prix or Four Aces Grand Prix, presumably are not supposed to charge more than \$8, and must include admission for the rider and at least one other person. However, some Grand Prix have been given special dispensation and are charging \$10 and up. AMA-sanctioned Grand Prix, such as the Elsinore Grand Prix, are charging as much as \$15. Of course, some of the additional cost in a Grand Prix is justified, as a Grand Prix-type event takes much more work on the part of the club to physically lay out the course and provide adequate flagmen and spectator protection and supervision.

An event like Hopetown Grand Prix, put on by the Dirt Diggers Motorcycle Club, requires hundreds and hundreds of man-hours of physical work and quite a few dollars in hay bales, tape, stakes, fencing and the like, not to mention hiring the rent-a-cops.

A well run Grand Prix can attract thousands of spectators. The biggest Grand Prix held right now in this country, spectator-wise, is the Dirt Diggers Grand Prix in Hopetown. It is not uncommon to have 30,000 spectators. The Elsinore Grand Prix, which many say attracted 150,000 to 200,000 spectators, is a no-charge-type affair. It is not AMA-sanctioned.

If a promoting club decides to charge admission, the admission charge cannot exceed \$1.25 for a Scrambles or Rough Scrambles event, and it cannot exceed \$1.50 for a Motocross. As of this writing, clubs are considering raising this limit for AMA races.

One additional charge may be levied to the riders, and that is, of course, the ambulance charge. The rule book states that either desert or scramble-type events must have a bona fide ambulance with attendants present at the event. An additional \$.25 may be charged to the rider when such a bona fide ambulance is present and provided. Motocross events vary slightly, in that they must have two ambulances present. This prevents any lags in time between races in the event of an injury.

Of course, these above fees are guidelines and any club can exceed the fee if they go to their district sports committee with a reasonable request and show why they desire to charge more. However, this is not easy to come by and they must submit record receipts and estimates as to why they demand more than the normal AMA guidelines.

If you are racing non-AMA events, such as the CMC, you can count on spending appreciably more money for these events than AMA events. A standard entry fee for a CMC or ACA event is \$5 mail entry and \$10 post entry, plus you receive up to a \$2 charge at the entrance of the track. This makes racing very expensive indeed.

The obtaining of a license for the sanction that you

WHAT DOES IT REALLY COST TO GO RACING?

desire to race in may vary from \$7 to \$25, so you can see that it is fairly easy to tie up a good deal of money just to pay for the privilege of racing. Perhaps this is why trail riding and playracing are so popular in this country.

RACING CAN BE AS EXPENSIVE as you want to make it; there are plenty of mucho-extra-buck bikes floating around looking for owners. But just for fun, let's see what it might cost the average 250 Novice to compete for one year, assuming he has a normal year.

To give our hypothetical Novice the benefit of a doubt, let's start him off on an inexpensive machine. How's about a one-year-old Yamaha 250 MX, just for giggles. That should cost him in the neighborhood of 700 bucks, for a fairly clean one.

Naturally, our man has to have a helmet; a decent one will average 40 bucks or so. Add another \$60 for leathers . . . Hold it, let's make a list:

Bike: \$700
Helmet: \$40
Leathers: \$60
Goggles: \$6
Gloves: \$10
Boots: \$50
Basic tools: \$200
Basic spares (plugs, etc.): \$50
Assorted body protectors: \$30

Wow, the total is already up to \$1176 and we haven't even gotten him to the track yet. Let's see . . . a used truck or van is going to run *at the very least* \$500 for anything halfway decent.

Of course, we can't forget a loading ramp and gas cans—that should take another \$20 or so out of his pocket. Tie downs are much better than rope; more money to be spent. Add to this the cost of license and entry fees and we can easily get to \$2,000—and the rider hasn't even started his engine yet.

OK, for the moment, let's assume the rider already has a bike and all the gear. Most guys accumulate stuff over the years anyway, rather than buy it all at one time. What's it going to cost the rider to compete every weekend, if he's already outfitted?

Right off, you can count on \$50 per month for fuel for the machine, gas to get to the track and entry fees. This figure can easily go higher if you must travel great distances to get where you're going.

The rider must also count on a certain amount of expense to maintain his machine. Assuming you never really break the engine badly, during the year, normal wear and tear will run you \$30 to \$40 a month. This takes into consideration tire wear, replacement of cables, chains, sprockets, plugs, fenders, bars, and occasional breakage here and there.

Add a blown engine to the cost and the sky is the limit. Most riders will pop new seals in at least once a year, and do an upper end job every six months or so. Add a few hundred for that.

Take one or two hearty falls during the year, and the old "patch-em-up" people will need some coins to do some repairs on the body (yours).

Actual cost of parts varies greatly from bike to bike. A 250 Yamaha piston will normally cost around \$13, while the Husky rider gets reamed out of over \$35.

TOP END PARTS PRICE BREAKDOWN

TABLE ONE

500cc COMPETITION MOTORCYCLE	RETAIL PRICE	(A) PLUG	(B) RINGS	(C) PISTON	(C) PIN	(C) SMALL BEARING	(D) SLEEVE (INNER)	(D) BARREL W/GASKET	HEAD & GASKET
AJS 370	\$1125	\$1.10	2 RINGS (2) \$7.20	\$27.10	\$6.80	\$6.62	\$60.00	\$92.00	\$49.80
BULTACO 360	1050	1.25	2 RINGS 7.00	30.00	3.90	3.20	35.00	120.00	41.70
CZ 360	1225	4.50	2 RINGS 8.80	40.00	8.88	7.28	48.00	176.00	47.50
GEEVES 380	1175	1.35	2 RINGS 6.00	32.00	1.68	(3) 1.61	N/A	150.00	55.00
HUSQVARNA 400	1320	1.20	1 RING 7.60	31.50	5.00	3.60	44.00	116.00	48.00
KAWASAKI 350 WITH MX KIT	1065	1.50	2 RINGS 5.95	24.00	2.50	2.50	N/A	80.00	20.50
MAICO 400	1248	2.45	2 RINGS 7.50	30.00	4.00	3.85	31.35	180.00	65.35
MONTESA 360	1096	2.50	2 RINGS 4.20	28.80	4.20	3.10	40.00	178.00	57.30
SUZUKI 400	995	1.00	2 RINGS 7.88	13.43	2.31	2.08	N/A	60.31	27.84
YAMAHA (MX) 360	960	1.25	1 RING 4.50	13.56	1.97	2.64	N/A	95.00	25.80

(1) PISTON ONLY
(2) PISTON, RINGS, PIN, CIRCLIPS
(3) BUSHING
N/A NOT AVAILABLE SEPARATELY

TABLE TWO

250CC COMPETITION MOTORCYCLE	RETAIL PRICE	(A) PLUG	(B) RINGS	(C) PISTON	(C) PIN	(C) SMALL BEARING	(D) SLEEVE (LINER)	(D) BARREL W/GASKET	HEAD & GASKET
AJS (STORMER)	1075	\$3.90	\$5.04	\$19.48 (1) (2)	\$7.00	\$6.62	\$8.08	\$97.10	\$30.12
BULTACO	945	4.75 1.20	1 RING 5.40	24.00 (2) (32.00)	2.50	3.00	30.20	98.40	40.00
CZ	1075	3.00 3.00	2 RINGS 4.40	23.40 (2) (32.00)	8.52	8.88	47.24	172.34	47.24
GREEVES	1095	1.12	2 RINGS 8.10	23.40 (2) (34.50)	1.68	1.56 (3)	50.00	120.18	57.60
HUSQVARNA	1130	1.57	1 RING 6.90	34.50 (2)	4.40	3.60	48.00	87.90	48.00
KAWASAKI (GREEN STREAK)	845	1.10	2 RINGS 5.00	12.50 (1) (12.50)	1.61	2.50	N/A	48.25	18.05
MAICO	1098	3.00	2 RINGS 14.00	30.00 (2) (27.50)	4.00	3.85	N/A	180.00	N/A
MONTESA	960	1.80	2 RINGS 4.20	27.50 (1) (27.50)	3.50	2.80	29.50	108.50	52.00
OSSA (STILETTO)	945	1.20	2 RINGS 3.48	12.00 (1) (12.00)	2.20	2.50	30.00	85.25	27.95
SUZUKI (SAVAGE)	895	1.10	2 RINGS 3.25	7.53 (1) (7.53)	1.85	1.53 (3)	N/A	31.93	17.99
YAMAHA (MX)	870	1.25	1 RING 3.00	13.00 (1) (13.00)	1.97	2.40	N/A	75.40	18.95

(1) PISTON ONLY (3) BUSHING
 (2) PISTON, RINGS, PIN, CIRCLIPS N/A NOT AVAILABLE SEPARATELY



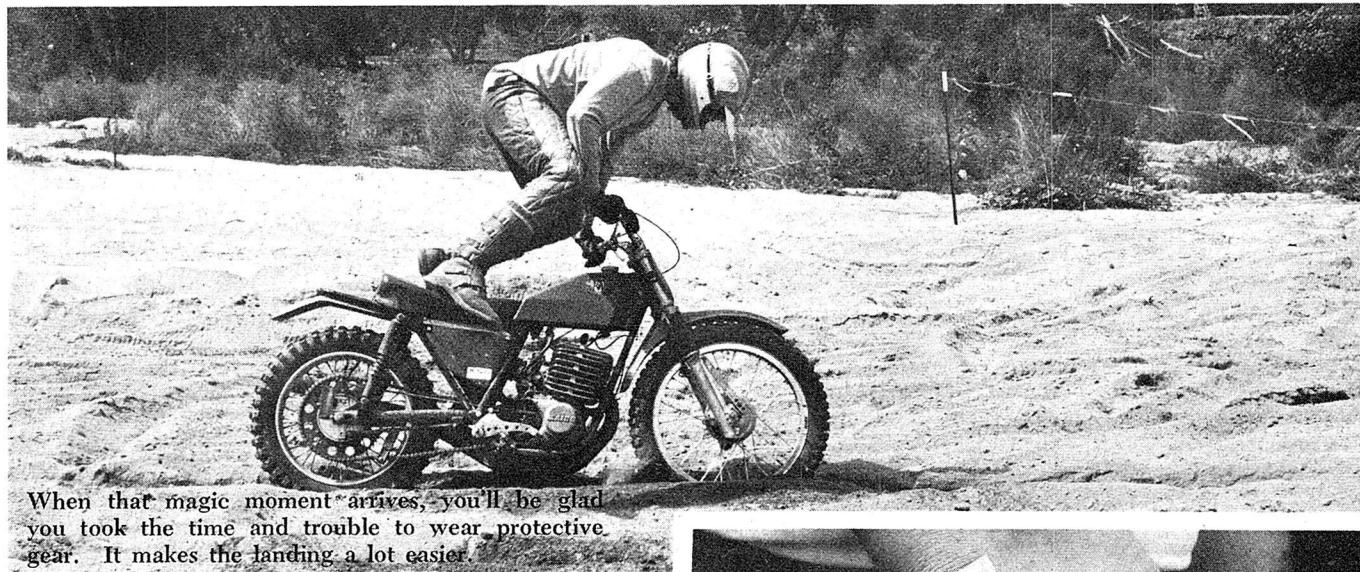
This seems even wilder when you look at the Suzuki piston selling for under \$10.

Jump up to the 500 class and the cost jumps right along with the displacement. Here, a 400 Suzuki piston sells for approximately \$14 and the 400 CZ piston goes for a whopping (get this) \$53 and some change. Even the 360 CZ is over \$40.

See the two accompanying charts (for 1971 models) for a good idea of the relative differences. Bear in mind that all have jumped slightly in the last month or so.

This, then, is what it really costs you to race. And that doesn't even include those stale hot dogs that you reluctantly purchase at the track. Lotta luck. *

PROTECTIVE EQUIPMENT



When that magic moment arrives, you'll be glad you took the time and trouble to wear protective gear. It makes the landing a lot easier.

Dirt racing is the world's most fun sport, but it can also be dangerous. Serious injuries are usually few and far between, but occasionally a rider will get off and bruise his body. Your chances at surviving a crash with no injury are greater if you have enough sense to wear good protective gear.

Safety items are often uncomfortable to wear and expensive to buy . . . but so are broken bones. As our old buddy from Albuquerque, Carl Shipman, says, "Dress for the crash, not for the ride." Any rider who goes out on the track wearing street shoes, a T-shirt, and no helmet will soon bear testimony to Mr. Shipman's wisdom.

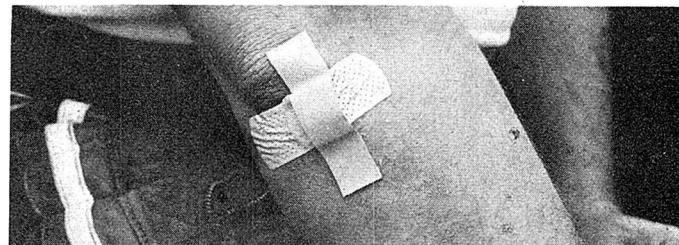
Let's start from the ground up and look at the myriad of protective items available to the racer.

BOOTS

Boots are probably the most basic item of protective gear in a racer's wardrobe. Feet and lower legs take a phenomenal amount of punishment in dirt riding. They regularly crash into rocks, cactus, other bikes, berms and, occasionally, fences.

The prospective boot buyer is usually confronted with a decision: whether to get lace-up (lineman's) or buckle-up (motocross) boots. There are advantages and disadvantages to both.

Lineman's boots are usually cheaper than MX boots



and weigh less. They are good for desert and cross-country racing because the protection extends higher up the leg, and they have a conventional heel on them to help grab the footpeg in rough going. Lineman's boots are available for purchase at most discount stores, while the MX boots are sometimes hard to find, particularly if you live in a small town. Lace-ups take longer to put on and take off, and the laces must be replaced regularly.

MX boots have a wedge sole, instead of a sole/heel. This design prevents the heel from snagging rocks and dirt clods when the rider has his foot down in corners. Some of the more expensive models have excellent ankle supporters and shin guards built into them, since the MX boots generally offer less protection in these areas than the lineman's boots. MX boots offer an additional advantage in that they usually have a spring steel piece under the sole to prevent the wearer's foot from being bent back in an unnatural (and very painful) position. They also have steel inserts in the front and rear portions of the sole to prevent wear.

You can expect to pay from \$29 to \$49 for a decent



For motocross or scrambles, most riders should use a wedged-heel boot like this; some desert riders insist on a full heel.

pair of lineman's boots, while MX boots will cost you \$39 to \$75. You pays your money and takes your choice.

LEATHERS

If you've ever fallen hard on your posterior and experienced the sleepless nights and endless standing caused by a giant raspberry, then you need not be told about the worth of leather pants. Shin, knee and hip pads also help leathers rank far higher than one or two pairs of Levi's in the protection department.

Road racing or street riding leathers are better than nothing at all, but they usually have either no padding or very sparse padding. They are also made of thicker leather, and are miserable to wear for three 20-minute motos.

Leathers vary a lot in quality and durability, no matter how much you pay. Before you buy, check around with guys who have been wearing leathers for a long time and find out which kind seem to be the most durable and offer the best protection. There is nothing more disconcerting than having your new \$75 pair of pants disintegrate after three wearings. Leather pants will stretch at least an inch in the waist after they have been worn a few times, so don't buy 'em too baggy because they'll just get worse.

Goatskin, sheepskin, or thin cow leather is the best material for leather drawers, because these hides are thinner and keep the wearer's legs cooler in a long race. Make sure the pants that you've selected are lined. If they're not, you'll curse a blue streak whenever putting them on and taking them off. Lining also makes leathers cooler to wear.

Leather pants cost from \$50 to \$100, and sometimes the most expensive brands are no better than the cheapies. Shop around.

After you buy your new leathers, stop off at a sporting goods store and buy a cup to wear under them.

A simple supporter isn't enough, unless you've had a lifelong ambition to be a choir boy.

SHINGUARDS AND KNEE PADS

Riders who crash a lot might want additional protection for their knees and shins. Basketball-type pads work fine for knees and a couple of manufacturers make plastic shin guards. Torsten Hallman leathers come with a nylon insert built into the knee to protect the shins, and Jofa makes a swell set of protectors that are worn under the pants and tuck into the rider's boots. If you used to be a catcher on a Little League team, you might have some baseball shin protectors stashed in a closet somewhere. These work fine, but score few points in the style department.

KIDNEY BELTS

Kidney belts keep your lower abdomen shored up and provide support for your lower back. They're really great in a long race and help minimize fatigue. Make sure that the belt that you buy is the right size: A too small belt will cause your eyeballs to bulge from the constriction, and a belt that's too big will be about as effective as wrapping tissue paper around your midriff.

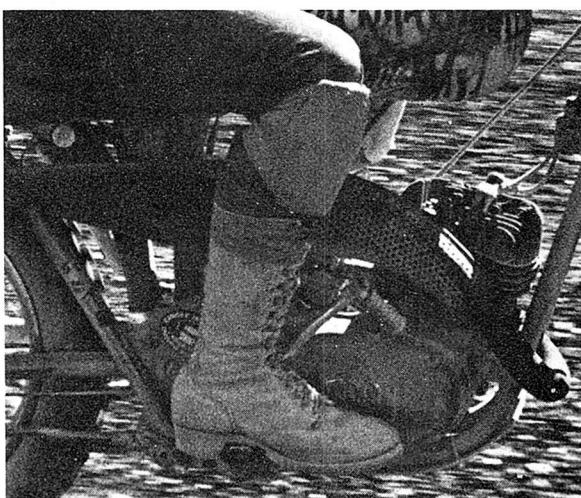
There are two kinds of kidney belts available. One is elastic and stretchy, the other is thick and stretches very little. Both types seem to work equally well, and which type is best is a matter of rider preference. Whatever you do, don't buy a cheap kidney belt . . . cheapies fall apart from the constant sweat soaking that the belts receive. Be prepared to spend from \$3 to \$8.

CHEST PROTECTORS

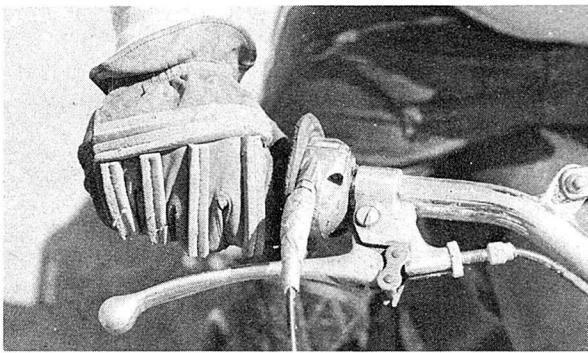
Most guys go out and buy a chest protector so that they will look like a European MXer.

"Gad, Harry . . . look there's Roger De Coster, wonder what he's doing in Omaha?"

Chest protectors are stylish, there's no doubt about it, but they are also very functional. They prevent rocks from bruising the rider's chest, and keep puncture wounds in the upper torso at a minimum in case of a crash. In hot weather, they prevent the cooling air-stream from getting to your chest, but any discomfort is probably made up for by the protection.



Even if you can't afford leathers, knee pads offer fairly good protection at a fraction of the cost.



Fully-ribbed racing gloves keep that skin where it belongs if you should happen to lay the bike down; especially if you pinch a lever over the knuckles.

Take about \$15 to \$20 with you when you go to buy a chest protector.

SHOULDER AND ELBOW PADS

These two items are great things to be wearing in the event that you crash, but a real pain in the neck to wear and carry around. That's probably why few riders go to the trouble. Again, basketball pads are great for the elbows. One or two accessory manufacturers have elbow guards made for bikers. A handy item.

Shoulder pads help prevent broken collarbones, shoulder separations, and dislocations. Hockey or football pads are fine; the hockey units weigh less with little compromise in protection. Fifteen bucks ought to be enough to get adequate shoulder protection.

GLOVES

Gloves are a must, unless you like blisters. If you're down on bucks, go to Sears or a similar madhouse and get a pair of leather work gloves. They aren't as good as MX gloves because they have seams on the palm of the gloves. These seams will cause blisters on your hands where they touch the grip, but not nearly as big blisters as you would have if wearing nothing at all.

The best plan is to get motocross gloves that are ribbed on the back. The ribs prevent the rider's fingers from getting squashed when he goes down and forgets to take his hand off the grip. They're also great for riding in brush, and keep the bushes and tree limbs from gotching your hands.

MX gloves have the additional advantage of light weight so the rider can get a better grip with more "feel."

Good gloves cost from \$5 to \$10, but don't last very long. Plan on getting a new pair every few months if you ride a lot.

MOUTHGUARDS

Mouthguards come in two styles: the football helmet type and the snap-on Jofa style. The football type offers more protection in a spill, but doesn't do as good a job as the snap-on in fending off flying rocks.

Here's a tip if you've decided to get the football type: Don't get the football type. What we mean is, don't get a helmet guard that was designed for football use. They usually have a steel core that isn't resilient enough for high-speed bike racing crashes. They are too stiff and could cause a sprained neck under heavy

impact. Check around and find a dealer or accessory house that has the bike rider guard, made especially for crash helmets.

GOGGLES

Goggles are mostly a matter of personal preference, depending on how much money you have in your pocket when you go to buy a pair and how good a salesman the guy is. They range from \$2 to \$12. Don't use welder's goggles or any other type that doesn't allow good peripheral vision. Also, don't wear any goggle that has untempered glass in the lenses . . . a flying rock could shatter the lens and cause untold misery. We prefer plastic lensed goggles, because they won't shatter on impact. Buy a few extra lenses with your goggles. They scratch easily.

Many goggles that are available at bike shops are made primarily for skiers. There usually isn't much dust on a ski slope, so you may have to tape off some of the ventilating holes to seal them better.

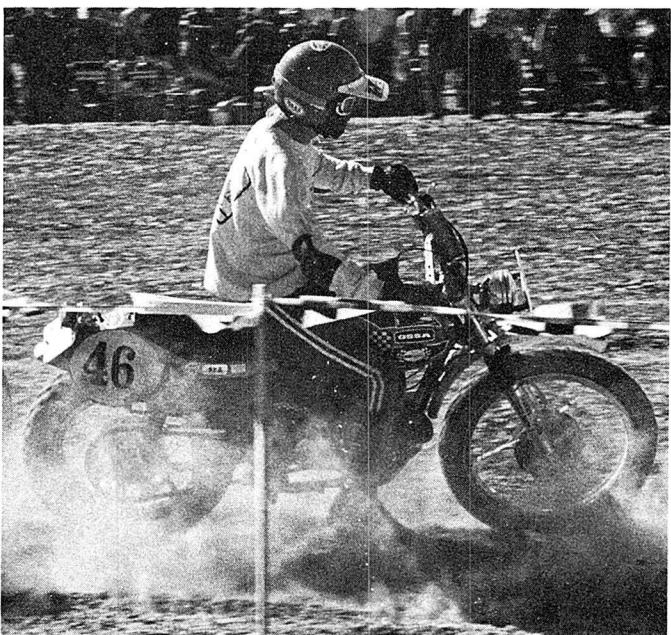
HELMET

We finally reached the uppermost part of your body, and the part that deserves the best protection—the head. Only a real dum-dum will go racing with a cheap helmet. Whatever type you select, buy the best; good brain surgeons are few and far between.

The full-coverage helmet offers the best protection, but some types limit visibility slightly and are heavier than the standard full helmet. We've heard of guys breaking their necks while they were wearing full coverage helmets. They were racing and crashed on their chins. We don't believe everything that we hear. Put a visor on your helmet, it will help break the impact of a fall, and keeps the sun and flying dirt off your goggles.

A good helmet will cost \$40 to \$70. Spend the money, they don't wear out very fast.

There you have it. Plenty of good, sensible ways to spend your money. Remember, it is impossible to have too much protection.



Elbow pads can be worn over a sweatshirt if the weather is too hot for upper body leathers.

HOW TO GET STARTED IN RACING- THE RIGHT WAY



Many people just starting out riding motocross may find things harder than they figured on. We'll try to help you get started the right way by teaching you (1) the ways to find the right bike (2) the proper way to set it up, and (3) the type of gladiator gear (clothing) that you'll need. All the basics of getting started in motocross.

PICKING THE BIKE

The best way to look for the right bike is not by the cost, the make, or even the color. There's a lot more to it than people think, all of it very important. If you're going into it for a hobby just on the weekends or if you're planning to be a professional, it's important that you do things the right way.

The best size bike for anyone to start on is a 125. They're a lot easier and cheaper to learn on than a 250 or 500. You don't get into many bad situations with them because of speed and handling. And if — no, not if, *when* — you go down, it doesn't hurt as much.

Borrow a friend's Yamaha, Suzuki, Penton, CZ, DKW, Puch, Bultaco, or whatever. Just get hold of as many 125s as you can, and see which one fits you best.

Just because Freddy Fearless rides a DKW, or Terrible Tim rides a Sears Allstate, doesn't necessarily mean that that's the bike for you. All riders aren't the same. We have different styles — which means we need different bikes to suit our styles. All of the above named makes have excellent 125s, and there are many that we haven't mentioned.

RIDING POSITION

Now you've found your bike. When you sit on it, the most important thing is to feel comfortable. If you're not comfortable, then you can't possibly ride well.

To find the best handlebar position, sit on the bike, both feet on the pegs. Close your eyes and reach out with arms extended in the most comfortable position. Your arms should not be so far extended that you wouldn't have control if your bike went into a wobble.

A good motocross handlebar is about 33 inches wide. The best types of grips are Doherty or Magura. Don't use the rubber-plastic type; they can form blisters.

HOW TO GET STARTED IN RACING
it'll be a strain on the engine. Start with a 3.50x18 knobby with 15 pounds of pressure. Again, the harder the terrain, the harder the knobby you should use. There are a lot of good knobbys. Choose any one you like.

CLOTHING AND PROTECTION

Helmets are by far the most important of your riding gear. If you think you have a \$9.99 head, then get a \$9.99 helmet. If you feel your head is worth a lot, then get the *best* helmet. Make sure that your helmet is snug — so it won't rock — but not so tight that it'll give you a headache.

Some people feel a lot safer with a full bucket; others prefer a regular type of helmet. Both types give the same amount of protection. If you're not going to get a full-coverage helmet, then it would be a good idea to use a rock-guard.

A helmet must have a visor, too. It helps shade your eyes from the sun and protects you from rocks, bugs and tomatoes.

Goggles should have good ventilation, to prevent fogging. There are three different colored lenses available: yellow, green and clear. Yellow lenses bring out rocks and holes on the track, and are good for dark days. Green lenses are good on bright days. Clear lenses are good for clear days and night racing.

Jerseys must have long sleeves to protect your arms when you fall and when you go by bushes. Sweatshirts are not recommended for summer use because they cause your body to dehydrate. There are many good-quality jerseys that are lightweight and come in many colors. They can be bought at any bike shop.

Chest protectors are good for rocks kicked up by other bikes (and for tomatoes, too).

Leather pants are very important. They should have a good silky lining to keep your body cool and to make them easier to remove. Get pants with a lot of padding around the hips, knees and shins. Leathers range from \$30 to \$60, and custom-made ones are available. If you can't afford leather pants, then wear two pair of Levi's. BVDs and athletic supporters are also recommended (no explanation necessary).



When choosing a bike, pick one that feels right. Sit on it, close your eyes and extend your arms. Arms and fingertips must rest naturally on the bars and controls. If it feels right, it'll be that much easier for you to get used to at racing speeds.

Now extend your arms again. See where your fingertips are? Well, that's where your clutch and brake lever should be: not above the fingertips and not far below them.

Footpegs must fold for obvious safety reasons. They should be low enough so that you can raise yourself off the seat quickly, but not so low that they'll dig into the ground. Your legs should bend to more or less an 85-degree angle.

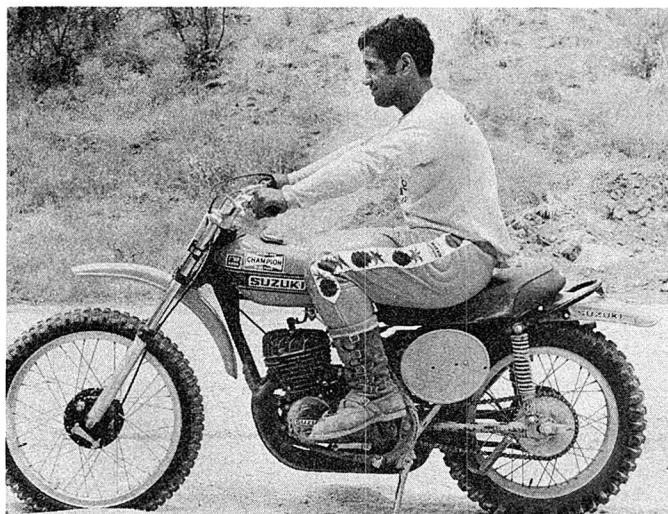
SUSPENSION

There's no doubt about it: the best shocks are Konis, Girlings and Curnutts. The lighter the rider, the softer the shocks, springs and the damping and vice versa. The best springs we've found for the average person are Girling's 60-90 progressives.

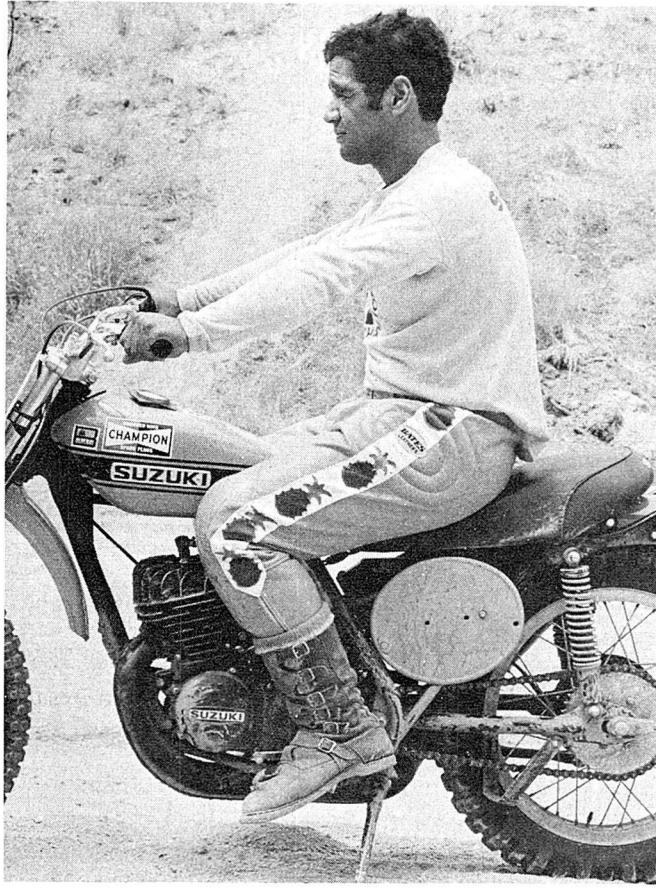
Most 125 bikes come with 20-weight oil in the forks, which should be changed before riding. In many cases, we've found metal particles from the factory in the forks. This made them very hard to work. A good fork should have a lot of travel. There are some 125s with spring forks; these are excellent, too.

Front tires should be 21 inches; they handle a lot better through whoop-de-dos, mud and wherever wheelies come in, especially over rough terrain. Thirteen pounds of pressure is about right to start with. The harder the terrain, the higher the pressure you use, and so on.

The rear tire should be as wide as the engine will permit. However, you don't want the tire so wide that



Footpeg position is important and your particular build largely determines what feels comfortable. The legs must not be too close to the horizontal position when seated. This gives poor leverage when standing and tends to cramp the rider quickly.



Proper footpeg height is as low as possible without the pegs digging into the ground with the machine heeled over. If you're on the short side, you may have to buy a machine with higher-than-desired pegs, in order that you may stand comfortably.

Boots give good shin protection and ankle support. They shouldn't have heels. If your boots come with a heel, take them to a shoe doctor and have a wedge fitted in. I say no heels because your heel could hit a rock and your leg would be kicked back — and *that* isn't desirable.

Lineman boots are the cheapest and offer good shin protection and ankle support. These can be gotten at any surplus store. Other good boots are available from Webco, Hallman, and Full Bore.

Use ski socks under your boots. They're thick and will help prevent blisters.

Make sure your gloves have the seams showing on the outside and the rubber protection on the top part of the glove. This gives good protection in case the clutch or brake levers hit your hand when you hit a bush or fall.

ORGANIZATION MEMBERSHIP

Now you're ready to go racing, right? Not quite. At most motocross events, you must have a membership card in order to ride. As in any other sport, there are rules and regulations that must be followed.

The American Motorcycle Association (AMA), the California Motorsport Club (CMC), and the American Cycle Association (ACA) licenses will be the most useful because these organizations hold the majority of the races in this country. All of these associations have some sort of insurance program.

The organizing club will assign you a number and

color for your number plate for that season, so no sweat on that. The best way to find out about the races in your area is to call a bike shop that sells motocross machines. They should be able to give you the needed information.

Another thing you should know about is the rider's entry fee. Some organizations will have a mail entry and a post entry. Some will have only one or the other.

Mail entries are sent in with your entry form and fee five days or so before your event. Say that you don't want to send it in — that you want to wait until race day because you don't know if you're going to ride or not on that particular weekend. The mailed entry would be about \$5 per class; by post-entering, you may have to pay \$10 per class to enter.

They do these things for a good reason. It's a lot easier for them to sign up 300-400 riders over a week's time than it is to do in a few hours — on race morning at that.

PRE-RACE PREPS

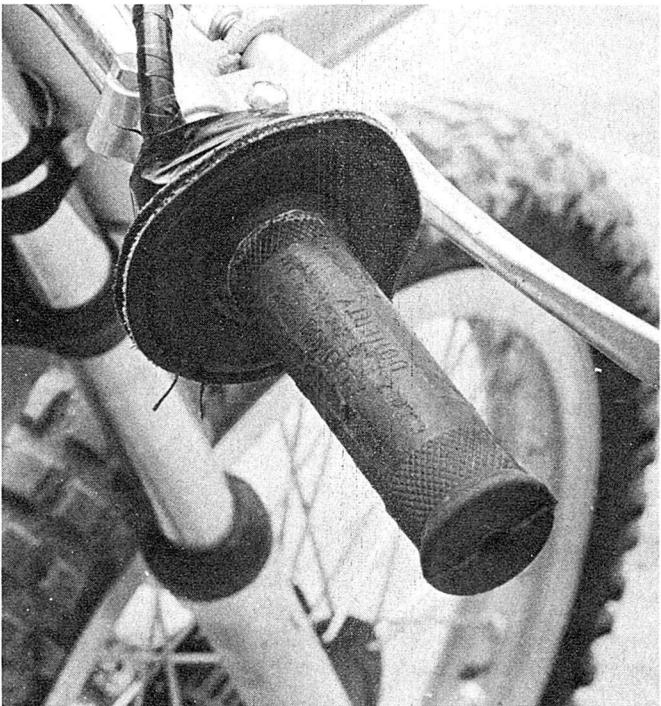
When you get to the track, the first thing to look for is the sign-up booth. If you mailed in your entries, check to see if you're listed on the rider's list. Get that taken care of before you start unloading your bike.

Next, look for signs designating the spectator area and the pit area. Most tracks don't have any pit riding, and you might get disqualified for the day. If there are no signs, ask someone.

If your bike needs tuning, look for the warm-up area. Hate to see you get punched by some guy because you go blasting up and down in front of his pit.

Check all your nuts and bolts and your tire pressure, and top up the fuel tank.

OK. Now you're ready to go racing. •



Grips should be small in diameter and made of soft rubber. Avoid those large waffle-patterned grips. They will tire the hand prematurely. Small touches like this can be added to any bike and mean a lot in overall rider comfort and control.

THE MACHINES- AND WHAT THE PROS DO TO MAKE THEM RIGHT

Most machines can be raced in standard condition and do fairly well, but all machines can benefit from those "little extras" that the winners use. Those "extras" can range from a simple cleaning up of the ports to major machining. How much you do, or have to do, in order to be competitive, varies from bike to bike, but the less you have to do, the better.

If you decide to spend enough money, you could probably turn a Sears Allstate into a workable MXer, but why bother?

What we will attempt to do here is to show you what the go-fast riders are doing to their bikes to give them an extra margin in speed, performance and handling.

Many will disagree with what is put down here; just as each cook has his own way of preparing a recipe, so do individual tuners and shops. This, then, is meant to serve as a guide, and to show you some of the tricks of the trade.

Conspicuous by their absence are a multitude of the smaller displacement machines. Lack of space doesn't allow us to go into all the machines on the market, so concentration is on the 250 and above racers.

You'll notice that we have divided the modification categories up into motocross, desert and scrambles. Some machines are more suited to one phase or another, by intent of the manufacturer. For example, the Husky was designed first and foremost as a motocross machine, but racers found out that it worked superbly, with a few modifications, as a desert rig. Conversely, very few Huskies are seen at a scrambles event—they just are not natural scrambles machines. Some riders, mostly dyed-in-the-wool Husky freaks, will go ahead and scrambles-modify one anyway.

This is by no means an attempt to be a "down-to-the-last-nut-and-bolt" technical treatise. It is, however, a damn good guide to things that would take you 10 years to learn. You are getting, in one fell swoop, the collected knowledge and trickery of a large number of specialty tuners. Enjoy.

HUSQVARNA

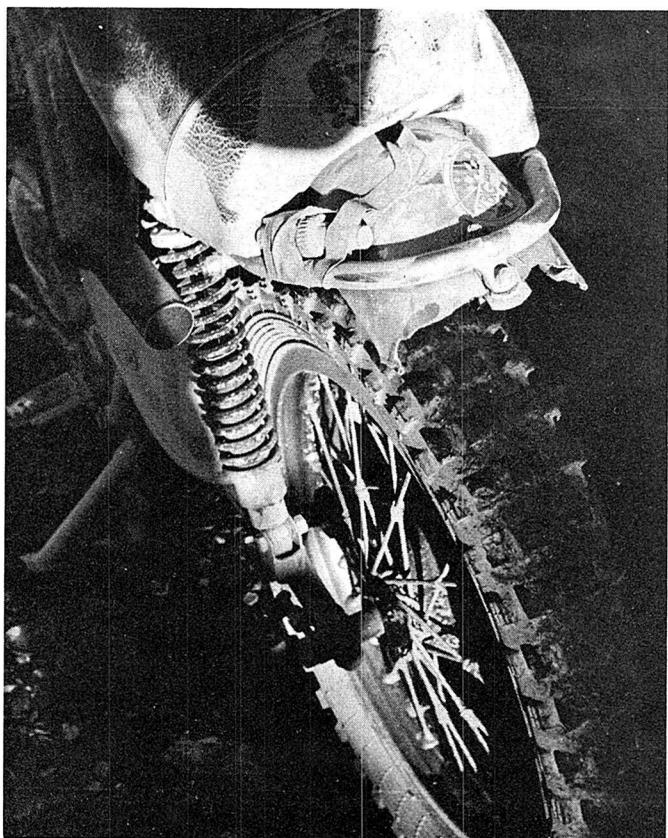
Husky makes a 125, a 250, a 400 and a 450. All are basically intended to be ridden as motocrossers—

nothing more. The only concession the factory makes, is the option of a wide ratio, multi-speed gearbox, realizing that Americans abuse the Huskies in the desert as well as on the MX track. They also offer enduro models.

MOTOCROSS

Even though the Huskies are primarily designed as MXers, much can be done to improve them as a prime weapon.

Most riders leave the chassis alone for motocross, with the exception of some instances of frame lowering.



Business end of one of the winning desert Huskies after the Mint 400 . . . ready for a complete rebuild.

When the frame is lowered, it is usually taken no more than 1½ inches. This takes away some of the quickness, which is characteristic of the breed. Riders with super-quick reflexes, or even those on the tall side, don't bother with this modification. Shorter riders, or those with a desire for more predictable (slower) handling, employ this rather frequently.

Care must be taken with the welding, as the Husky incorporates a chrome moly frame, and improper welding is almost a guarantee for a broken frame.

Huskies come with miserable fork seals, and these are usually replaced with those from a 350 Honda, or the new Universal seals. Both work fine.

The Husky comes with good wheels and tires, but most of the savvy racers throw away the standard aluminum rim locks and replace them with the rubber Japanese items. The aluminum ones have an alarming tendency to break into a million small pieces under impact.

The normal pegs are not the greatest units going, and are downright slippery in muddy conditions. Replace with any number of accessory pegs.

Most riders (serious ones, that is) get rid of the overly heavy metal components and hang on a small plastic tank and fenders, saving considerable weight.

The engine itself doesn't need much work, but waterproofing is a must. There are several shrouds on the market built specifically to keep the gorp out of Husky internals. They must be used, or the bike will inhale buckets of water.

For a really strong engine, the ports should be cleaned and matched up. Going one step further, 2 to 3mm down on the intake and raising approximately 1mm on the exhaust will put more life into the powerplant. Some shops open up the ports slightly, but not a great deal. The step in the port can also be reshaped down somewhat, but not radically.

One small operation that makes a big difference in mid-range response is taking 60mm out of the head pipe. Rejetting may be necessary.

DESERT

When you take your new Husky out of the crate, the first thing to do is install the forks. Notch the upper race with a file so you can grip it with your pliers or, better, vise grips. Otherwise, it's difficult to get it tightened down sufficiently. After you've got the forks on, Loctite the crown nut so it won't vibrate loose.

Pull off the gas tank and wrap the packing foam from the crate around the backbone and tape it. This will keep the tank from vibrating and cracking; it seems to reduce tank cracking from metal fatigue by about 75 percent. The seat should be padded for long-distance riding to reduce body fatigue.

Make sure your Husky has the new Stefa coil. It is small and blue in color, so you can readily identify it. Install one if it's not already standard equipment (which it is on the newer Huskies).

Your next step is to drain the engine oil and put in a good grade of 30-weight. Bring the oil up to the specified level. This assures adequate lubrication during break-in; after all, you don't know what position those shipping crates were stored in.

Safety wire on three other things is a must (other

items may be wired, by personal preference, but these *must* be done): One, exhaust flange on the cylinder (Allen bolts); two, air cleaner mounts; three, rear exhaust mount.

Don't forget to install your Filtron air cleaner. If you're competing in a dusty area, you can run a double Filtron. Loctite all nuts and bolts, even if they're safety-wired; vibration on a big Husky will loosen them over a period of time. You don't want that to happen half-way through the second loop.

Extend the crankcase breather tube to about twice its original length and route it away from the engine. Tape it to the frame.

There are a few things you can do on the engine, but basically it's best to leave it alone. Husqvarna makes a reliable, strong engine, and you won't improve it by messing with it—and possibly decreasing its reliability.

Drill holes through the cylinder wall into the head mounting stud pocket to let in cool air to keep the temperature down. This helps to prevent hot spots or seizures. On models that came out before mid-1970, the head can be relieved about .030. Newer models already have the head raised a millimeter and don't require this.

Use a piece of wire to seal the rubber cap over the carb. This way, even if the carb bell gets loose, it won't suck in any air. This can save you a seized piston.

To help save your engine, use grease as a sealant on the air cleaner. Don't use 3-M for this particular purpose; it can dry out and crack—and you lose your seal. It can also make it difficult to get the manifold (from air cleaner to carb) off if you have to change your jetting. A cracked sealant will permit the sealing ring to flutter and take in dirt. None of that does your carb or your performance any good.

Pull the flywheel and check the sealing plate screws behind the flywheel for tightness. Tighten the case screws behind the magneto. Replace the ignition seal with the rear wheel bearing from a Husky. It's a double-lip seal, and seems to give a longer life in competition.) Reinstall the flywheel and tighten to 64 ft-lbs. of torque.

While you're into the ignition side, check your timing. No special tricks here; set it at standard Husky timing. It works.

There are a number of other special alternatives in setting up your Husky. These are pretty much up to the individual and the way he rides.

Dual ignition Huskies run fine on one plug; it's more a back-up than anything else.

You can also get into fork modification. This is no big thing, as Huskies have excellent stock springs.

Modification includes installation of double seals and changing the dampening slightly. The fork legs have to be machined just a bit to install the double seals, but it's probably worth it—especially if you're racing cross-country or long distances.

You can lengthen the swingarm 1 inch for better stability in high-speed riding. It seems to improve the tracking ability of the Husky for desert racing. Don't forget, this is basically a motocross bike. The short swingarm is fine for the sharp, quick turns of motocross.

If you like a really light feel to the front end, you

can cut the frame at the rear gusset (where the cradle tube comes back up to the backbone) and lower the engine a little. This will increase the fork rake slightly at the same time.

After you run a tank of gas through the bike, readjust the clutch. The clutch springs have to be screwed down. Check the tension on the clutch nut and then Loctite it.

CROSS-COUNTRY SPECIALS

Some special attention should be given to your machine if you're planning on a lot of racing over unfamiliar, rough terrain, or even as added insurance in cross-country racing.

The brake stay bar should be reinforced to insure a year or more of trouble-free riding. The stock bar is OK, but a little help never hurts. Put a good skid plate or I.S.D.T.-type protection bars around the underside of the engine. I.S.D.T. bars are stronger on sideways impact than a conventional skid plate.

As a final step, go over every nut and bolt once more and make sure you remembered to Loctite them.

SCRAMBLES

If you decide that you must ride a Husky at scrambles, then your prime consideration is to make the machine more of a slider and slow down the handling considerably.

The surest way is to lower the frame *and* extend the swingarm 1½ to 2 inches. Also, slide the forks up in the clamps about ¾-inch. This stuffs that front end down there and helps prevent washout in the sweepers.

As with the desert mod, holes should be drilled to the through studs for cooling.

Much of the weight can be pared off with a small seat and tank, and plastic fenders. Of course, tires depend on the track. One thing for sure, Trelleborgs or Barums don't make it on a scrambles track.

Standard gearing for a big Husky is 12 up front and 53 at the rear. Generally, a shift to 12-48 will do the trick at most fast scrambles tracks.

The same porting mods that are used on the MXer can also be employed for scrambles. Just don't go too wild—Huskies don't like to rev. Gear for maximum utilization of mid-range torque, not ultra-high revs.

GREEVES

You don't see that many Greeves nowadays, even though they once were *the* bike to beat, especially in the desert. Yet, a properly set-up Greeves is competitive. Not that much is being done to them—we had to search far and wide to find out the limited amount of fine tuning that is being done. Yet, this small amount of fiddling helps.

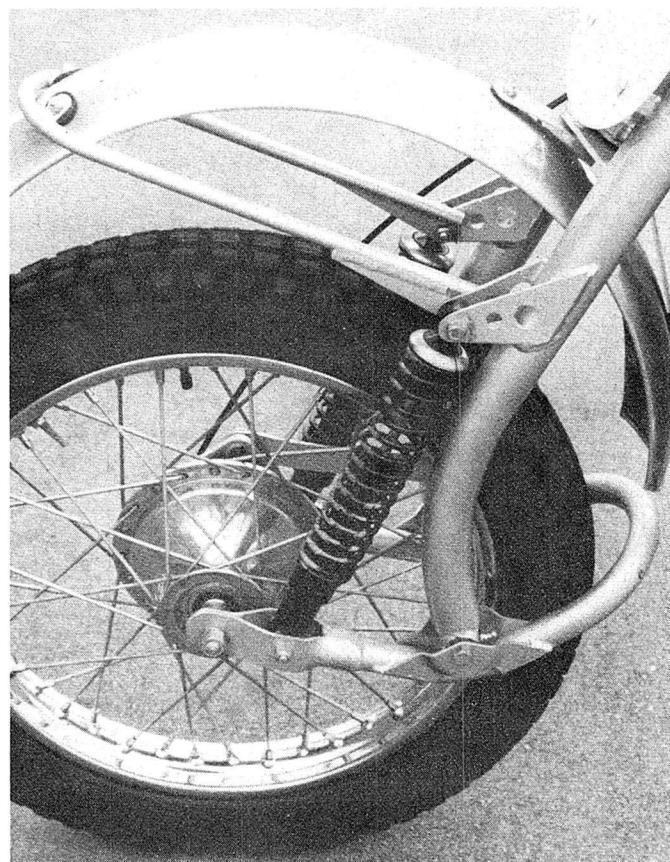
DESERT

If you're going to campaign the desert, chose the desert model Greeves, rather than the close-ratio MXer. And if you're really smart, you'll order one with the springer front end. This is the best punishment-absorbing unit available today. It transfers very little shock up to the rider and weighs little more than the telescopes on their motocrosser.

Most of the Greeves specialists recommend leaving



Greeves used to be king of the desert until a few years ago. They still offer the most non-tiring ride available.



The secret is the Greeves springer front end. Though too heavy for MX work, they do a great job for cross-country.

the porting pretty much alone, except for cleaning up the rough edges and doing a little fine matching. They do not respond well to raising or lowering of the ports, and chances are you'll lose power, rather than gain. At least that's what we were told by several Greeves freaks.

Mostly, they just change carbs, going to a 32 or 34mm Mikuni.

Naturally, a skid plate is added. For a paltry \$18.95, Fun and Fast offers a good one which will give you good protection.

A must change is the filtering system. Throw away the Fram elements and install a No. K303 Filtron.

Gearing is 15 countershaft and 52 at the rear. Most desert work will demand a 15-48 selection for optimum use of the good mid-range torque. It is not necessary to buzz the engine to get it pulling, even on the smaller 250 Greeves.

If you are sticking with the conventional telescopics, get rid of the stock seals and replace them with those from a Honda 350.

Timing should remain at the standard 4mm BTDC.

Keep a close watch on the models with the conventional ignition system as the phenolic lock wears rapidly, causing timing to slip. If the timing is allowed to slip too far, the Greeves will turn immediately into the ultimate pig of all times. Their new models have a modern system that seems to have eliminated this. Some dealers offer a conversion to the newer setup. Check yours for availability.

MOTOCROSS

The close-ratio Greeves gearbox is the way to go for MX, but some riders express preference for the wide ratio. Personal preference rules here. Telescopics are a must for MX work, as the springer displays a hunting tendency for tight cornering. The standard 13-54 gearing seems ideal for most motocross tracks.

While the standard pegs are marginally OK for desert work, some rough spots must be welded on the pegs for better gripping in the mud. Most accessory pegs will not fit the Greeves machines.

As in the desert setup, ports can be cleaned and matched, and a Mikuni is the way to go.

All of the other mods to filtration must be made, and waterproofing is a must, though a difficult job. The Dzus snaps hold on the side panels and offer very little protection from water. Greeves are notoriously poor in watery conditions. Duct tape will normally be required in large quantities to keep the wet out.

The standard Girlings don't seem to last too long on the rear, and most riders end up happier with Konis. 1972 Greeves telescopics are Metal Profile units, and are not as good as previous Cerianis. Serious riders scrounge around for used Cerianis and can the MPs.

SCRAMBLES

Very few riders campaign Greeves on the smooth stuff; a notable exception is DIRT BIKE's Jim Connolly, who was District 37 Champ on a 380 Griffon.

Very little was done to his bike, other than hanging on a Mikuni and changing the gearing to keep the bike working at mid range. Tall gearing (15-48) seems to be the answer, even though the bike tends to bog down off the line if the starting technique is anything less than perfect. Considering the bikes come with a 13-tooth standard countershaft sprocket, this is a huge jump.

If you really want to get freaky, there can be a bunch of ponies coaxed out of a Greeves. Most riders, however, say that reliability will suffer greatly when these methods are employed.

This consists of raising the exhaust 2 to 3mm and doming the exhaust shape. Some have experimented with a fifth port window and have found varying degrees of success.

One of the simplest power-getters is the installation of a 250 Greeves road racing pipe on the 250 model. Lots of luck on finding one, though.

The compression ratio should be left standard. A Greeves doesn't like the heat and will let you know right away by becoming one solid piece.

For smooth tracks, a 4.00x19 Perelli up front and a 4.00x18 Carlisle at the rear seem to be the combination.

For rough scrambles, a 4.00x18 knobby and a 3.00x21 or a 3.25x21 trials seem to be as good as anything would be.

The Greeves engine seems to be happiest when it can use the massive torque rather than high rev. So bear this in mind, and don't tamper with the engine a great deal. Learn, instead, to ride in the power band at all times.

AJS

AJS introduced their motocross bikes in the U.S. in 1969. They offered two models, initially: a 370 and a 250. The 370 has been dropped and replaced with a 410. Both models are available with either a close or wide-ratio gearbox. The 410 is very new as of this writing, so the trickery for this model has not been devised yet. The mods listed below for the frame and running gear are applicable to both the 370 and 250, but the engine modifications are for the 250 only. There aren't very many 370s around simply because they aren't very competitive, unless a bundle is spent making them right.

MOTOCROSS

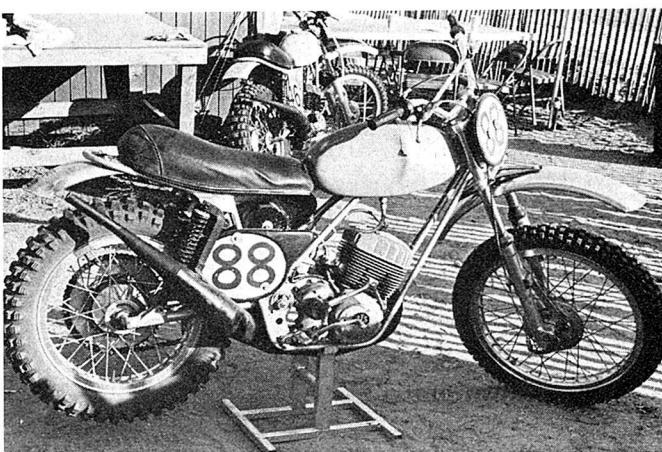
In the frame and suspension department, the swing-arm pivot bolt should be replaced with a chrome moly bolt. The stocker is OK for most riders, except for the experts.

Fork seals should be replaced with Universal seals or a similar "hydraulic"-type seal.

Rear shock mount on the swingarm may be moved back if a slightly softer ride is desired.

Wheels, hubs and spokes can all be left standard, but make sure that the spokes are always tight, or the Ajay will break a lot of them in a very short while.

Replace the springs on the brake shoes with Amer-



AJS racing machines need a number of modifications to be totally competitive. This Grant proto has them all.

ican springs with slightly more tension, but don't bother until the stock springs become ineffective.

Here is how to get a little more punch out of the 250 Ajay engine: Keep the stock port timing, but match ports and remove the rough spots. Mill the head to give 12:25 compression ratio on the stock bore. (Not for desert.) Replace the stock Amal carb with a Mikuni VM 32, and jet it carefully.

Switch to a Japanese ignition coil; a coil from a Kawasaki F-21-M works well. There are several others that are more easily obtainable and have the same value as the stock AJS coil, but are a lot more efficient and dependable.

Added gearbox efficiency and dependability can be attained by replacing the standard grooved thrust washers with thrust bearings. Throw away the countershaft sprocket nut locking plate if you are a hard rider. Replace with a hardened dowel pin.

If you do a lot of work on your engine and tranny, replace the stock case screws with rolled thread Allen bolts. They don't tear up the aluminum threads as much.

Use Castrol 10-50 GTX oil in the primary case instead of the recommended 5- or 10-weight. This makes primary chains last much longer.

Of course, your motocross AJS should have the close-ratio gearbox. Toss out the stock chain when it wears out (or sooner, if you're rich), and replace it with a Diamond.

AJS gearboxes have very brittle shifting pawls that break occasionally. There isn't much that can be done about it, but if you are riding along and the bike becomes hard to shift into one of the gears, *take it easy* and try to avoid using that gear for the rest of the race. Pawls are cheap, but if they go all the way, it may be good-bye ratchet.

For added security, replace the brake rod on your Ajay with a stainless steel replica, and harden the rear brake arm to keep the splines from getting sloppy.

Clutch on the AJS is durable in stock form and doesn't usually need any beefing. Don't bother messing with the chamber, either; the stocker is very efficient.

Loctite everything!

DESERT

All of the above mods will double for the desert. Wide-ratio gearboxes are best in the open country. A skid plate and larger gas tank may also be necessary, as well as a 52-tooth rear sprocket.

SCRAMBLES

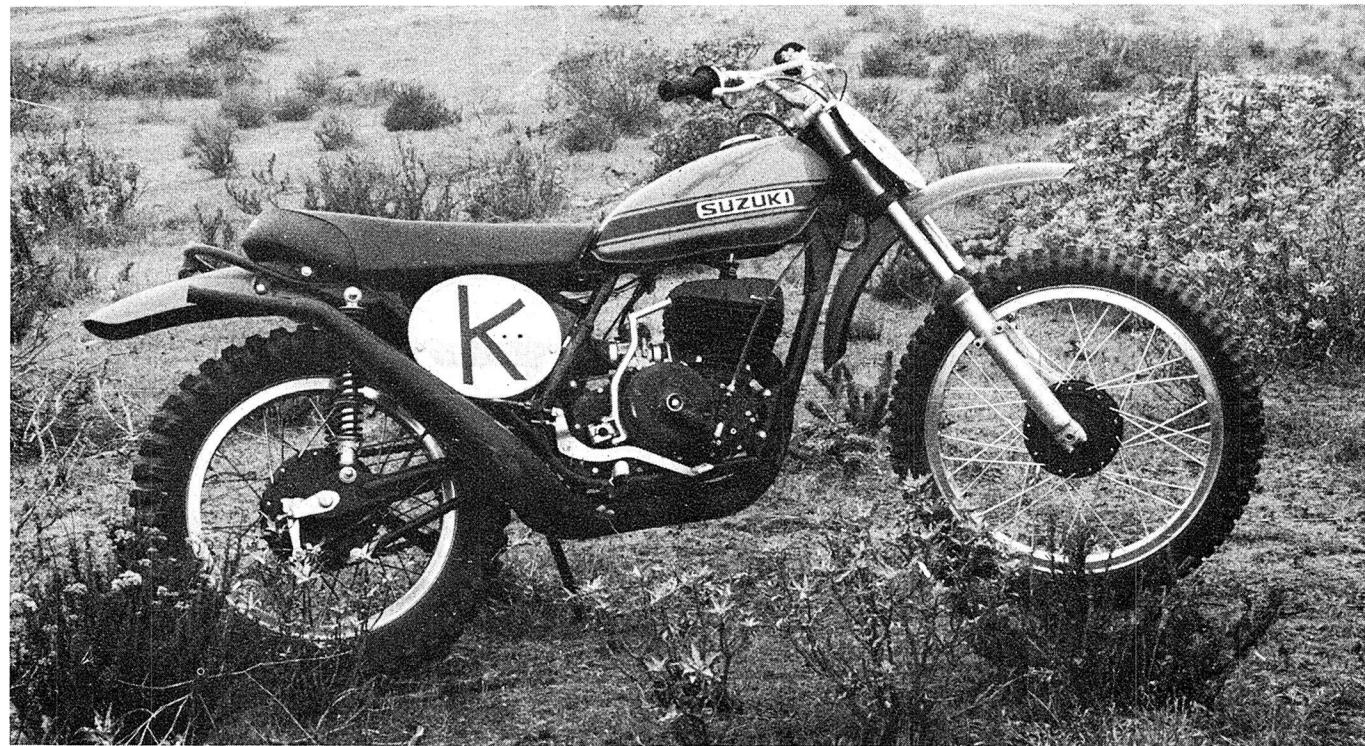
AJSs are rarely used for scrambles because the engines are too slow-revving for lots of high-speed stuff. If you are bound and determined to scramble the Ajay, experiment with a different chamber in combination with piston skirt trimming and changes in port timing. Good luck.

SUZUKI

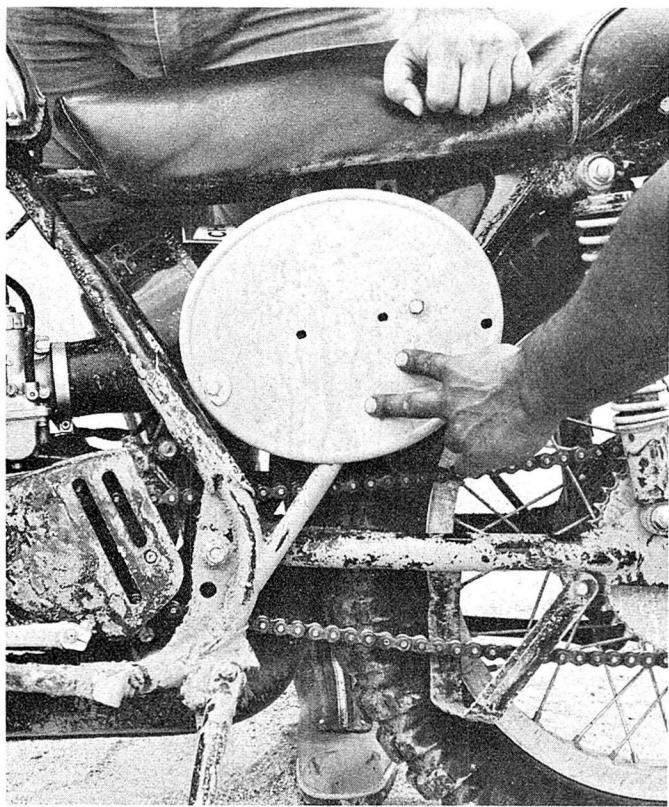
Suzuki only makes two real dirt racers, the TM 250 and TM 400 MX. The 250 hasn't been released as of this writing, but the 400 has been around for a while.

Many Suzuki trailbikes are made into racers, but the transition is expensive. Performance kits are available from the factory, and most of the suspension components must be beefed up or replaced. It's up to you to decide if it's worth it. We don't think it is, because by the time you spend the hours and bucks necessary to make the bikes competitive, you could have gone out and purchased a real race bike. Resale value on stripped trailbikes is ridiculously low, also.

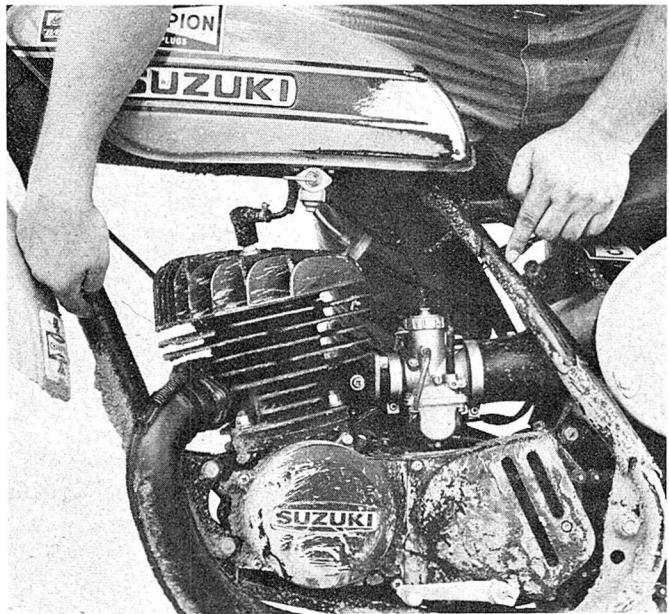
The 400 MX is relatively inexpensive, but needs some



A standard 400 Suzuki. Nobody, but nobody, races one of these successfully in out-of-the-crate trim.



Extensive frame modifications are needed to make the 400 Suzuki handle properly. A cut must be made here . . .



. . . and on the front downtube. Additionally, the spine members must be bent before rewelding.

work to make it perform and hold together. Here's what the hotshots are doing to the 400:

MOTOCROSS

Remove the oil pump, oil tank, and cable. Run a pre-mix instead. The throttle cable will have to be replaced, but there are several standard Japanese cables that will work just fine.

Toss out the stock air cleaner and install a Filtron or similar replacement.

Install an inline fuel filter. This is a must, not only on Suzukis, but on any bike that uses a Mikuni carb. Mikunis are very sensitive to dirt in the needle valves.

Clean and match the ports, and trim 2mm from both sides of the intake and exhaust ports. Leave everything else alone, except for carb jetting. A Champion N3 spark plug works good in the TM 400.

First thing to do to the frame is throw away the rear shocks and replace them with Konis. Experiment with different oil weights in the front forks—it makes a big difference in Suzook forks.

Keep the handlebars low. Bates' lowest MX bars are good replacements. If the bars are too high, the bike will want to stand up on its rear wheel more often.

Suzuki 400 spokes must be checked very often for slop, especially when the bike is new. *Don't* wire them where they cross or the spokes will break. A certain amount of flex has been built into them.

Grease the swingarm pivot frequently.

Replace the motor mount bolts with strong American bolts with aircraft locknuts on them. This will do wonders to stifle the vibration and the ensuing cracks that usually appear in the fenders, chamber, etc.

Speaking of fenders, plan on installing unbreakable plastic units.

A 4.50 tire should be mounted on the rear. The added diameter will help the handling.

Replace the chain with a Diamond. Toss out the countershaft sprocket and replace it with a sprocket from a T-500 Suzuki. Chain size will have to be upped from #525 to #50. The rear sprocket should also be changed to accept the wider chain. This may involve some machine work, but will make the drivetrain more dependable.

DESERT

Add to the above changes: a larger gas tank and a skid plate. Experiment with gearing changes.

SCRAMBLES

Forget it.

Many riders experiment with their 400 Suzuki's handling by cutting the frame. This is not the way to go, from our experience. The welding that has to be done weakens the frame to a dangerous point.

If you are unhappy with the way your Suzuki handles and you think that it's the frame, replace it with an accessory frame. Cheney makes a nice one that is just like last year's works frames.

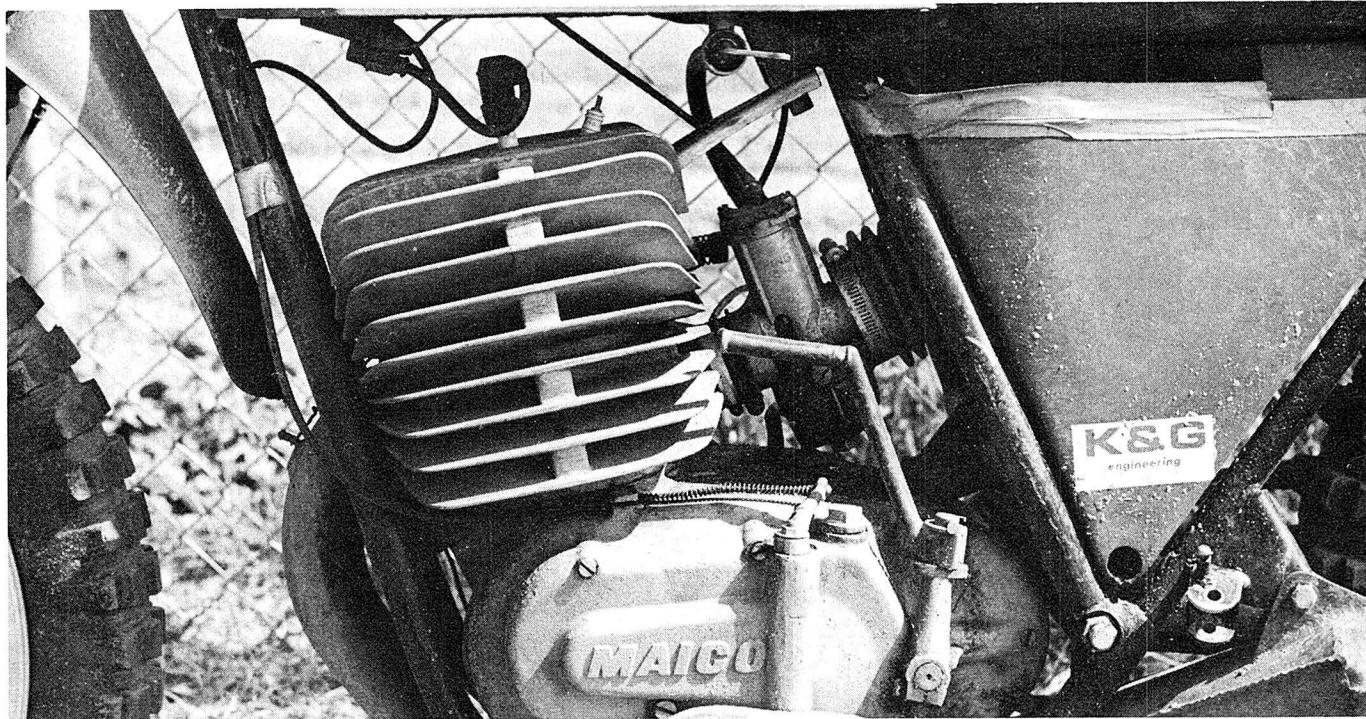
MAICO

Maico is one of the most versatile machines available to the rider. With very little modifications, it can be made to do just about any job. The emphasis is, of course, on motocross, but they also make superb scrambles bikes.

A number of general things must be done to the Maico before any modifications are made to it, for any form of racing.

Most of these center around the absolute necessity of decent filtration. In standard trim, the Maico paper filter is little better than a nylon stocking stretched over the carb inlet.

You must go to a Wheelsmith adapter and a modified



Maicos are very versatile and are claimed by many to be the best handling out-of-the-crate racers on the market.

rubber boot from the carb to the filter housing. A Filtron or K & N is a must. Generous use of sealant around the boot and top of the carb is also a must.

Most riders also opt for Konis instead of the Girlings. They last longer; simple as that.

Additional power can be had through what Maico calls "stage tuning." This consists of taking the power up one stage at a time, with each stage interrelated. It is fully outlined in the Maico manual, with all questions answered. Using the following 250 stage sequence for a guide, you can see the progressive steps. Space does not allow a step-by-step on each model.

STAGE TUNING FOR MAICOS

The beauty of this system is that it is integrated. One step does not conflict with the next, more radical step. What you get is power. As much as you're willing to play around with.

For those of you who think that more power is the answer, here's exactly what the factory does for its riders. But first a little warning. Once it is done, that motorcycle will need more in the way of maintenance and will be very sensitive to exacting setup. The engine can't be slapped back together, or it will be about as reliable as a supercharged Triumph Cub.

From the base gasket down, the only change is the roller bearing on the timing side of the crank. Gently sand the crank down with a piece of fine emery cloth until a ball bearing (the same as on the drive side of the crank) can be slipped on by hand. Remove that bearing and press it into the crankcase after the case is heated to 250 degrees, and then reassemble the bottom end with extra care.

Now the going gets tricky. You can do it in increments, or stages as the factory calls it. Stage 1 calls for nothing more than widening the ports. Use extreme

care in widening the inlet and exhaust ports, because the stud holes are awfully close. Should you grind into them, you will gladden your local Maico dealer by spending \$180 for a new jug. The exhaust port gets widened only 16mm on the top and only out to approximately 5mm on each side. The inlet port is widened as much as possible without getting into the back stud holes.

To increase torque throughout the range, mill the head so that the deepest part of the combustion chamber is 20mm deep, measured from the gasket surface of the head. On the average Maico, this will amount to .050. Most of them will vary from this figure.

After milling, the piston will strike the head, thereby reducing all power and torque to a big fat zero. So, the quench area of the head must be relieved to clear. The shape of that quench area is very important as it determines the flame front shape. *Do not* change the contour as you relieve it; keep the profile the same.

When the compression is raised, the ignition must be retarded to 1.5mm before TDC—unless you happen to collect holed pistons and would like to enlarge your collection.

As long as you're in there with the old Roto-Rooter, you should also match the ports up with the liner as much as possible. But watch out for those stud holes. Chamfer the new edges of the ports, so that the rings won't catch in them and break off.

Stage 2, the maximum mod for motocross, calls for modifying the pipe, raising the top edge of the exhaust port to 38mm from the top of the cylinder and ensuring that the carb is up to the engine demands. If the bike doesn't have a 36mm Bing already, mount one. A 34mm Mikuni will serve as an acceptable substitute. Jetting and modifications to the carb are illustrated.

Take 3.5 inches out of the head pipe on the chamber

HOW TO WIN AT RACING

and add 1.25 inches to the length of the midsection of the pipe bulge. This will raise the rpm range and will necessitate a gearing change: about five more teeth on the rear wheel sprocket.

Stage 3 (recommended for fast TT, road racing and fools) calls for raising the exhaust port to 36mm from the top of the cylinder, widening the boost port and lowering the intake ports. The power band will be very narrow with no low-end torque. The engine will be a hand grenade with the pin pulled. Fifteen minutes will be the longest that it can be raced continuously at one time, flat out.

Widen the upper 16mm of the boost port by 4mm on each side. Just clean up the lower part of the port. Lower the bottom of the intake ports to 113mm from the top of the cylinder. Cooper Motors, Western Maico Distributor, has some Stage 3 liners in stock for those who wish to buy them ready-cut.

Due to the very high rpm, the stock points will float and cause a misfire. It will be necessary to fit 125 Maico points, if they aren't already fitted, although some later models have them. If your points are mounted on the front side (the side toward the front wheel), you save a minor hassle getting the later ones.

If you should want to, you can do everything except raise the exhaust port no higher than 38mm, and you will have a duplicate of the factory racers. Most riders will find this too difficult to ride, as it takes a true expert to handle it. Only .5 percent of the riders in this country are ready for that. The other 99.5 percent should just stick with the Stage 2 mods. (Each stage includes all that was done in the stages before.)

These specs must be strictly adhered to or a power loss will result. For instance, the boost port looks as though it can easily be widened some more to let the engine breathe better, right? *Wrong!* Fuel/air velocity will be lowered and low-end torque will disappear as a result.

Setup now becomes incredibly important. If it's not done right, it won't finish the second moto. The factory starts with a new standard bike, changes the bearing and pipe and grinds away the ports and head. Then they break the bike in gently for a couple of hours. The top end is pulled off and bored out to the next oversize as precisely as possible. Tolerances are held very close. The new piston is fitted with only .0015-inch clearance and a break-in period of five hours follows. As before, this break-in is done very gently to avoid excessive heat buildup.

The extra power increases the stresses on the engine, especially on the piston skirt. After four or five races, the piston is replaced with a new one. The wrist pin needle bearing is replaced after eight to 10 races. All of this is in addition to the usual maintenance on clutches, chains, loose bolts, sprockets, cables, spokes and tires.

To go along with these modifications, tuning specs on the Bing are altered a little. Set the float height so that the molding line in the side of the float is 19mm above the level of the float chamber gasket surface (without the gasket) as the carburetor is held upside down.

Cut a rectangular notch in the bottom of the carb slide. The notch is in the rear face (the side toward the piston) and its size varies according to the number

	Standard 250cc	Modified 250cc	250cc
Needle	4	1	6DP
Needle notches from lean position	2	2	2
Needle jet	1610	275-280	0.5
Slide	5	1	2.5
Pilot jet	35	40	35
Air jet	—	—	2.0
Air screw (turns)	1.5	1.5	1.5
Main jet	165	170-180	210
Engine timing BTDC (mm)	3.0	2.7	2.7
Carburetor (mm)	30	36	34
Size and Make	Bing	Bing	Mikuni
Bosch spark plug gap at .022-.024	290	290	290

on the slide. This will improve the bottom-end response.

Now that you can see how stage tuning applies, here's how you can adapt it to the different kinds of racing.

MOTOCROSS

The chassis should be left alone for MX. It is *right* as is. One change you will want, will be a better front brake. Lacing up a Husky or a Yamaha front hub to an alloy wheel not only gives you better stopping power up front, but garners a weight savings. The normal Maico front brake is inadequate for MX.

Konis are a good replacement for the standard Girlings, and many riders replace the rear rim with an alloy one when it gets dinged out of shape. This doesn't take too long; the stockers seem to be made out of frozen butter.

For MX, many opt for self-cleaning accessory pegs, but the stock items are passable. A shroud should be made for wet or muddy conditions, but the normal still air box gives excellent protection. The previously mentioned air cleaner setup must be used for all types of racing.

For a normal racer, the ports should be cleaned up and matched a bit, but not changed in height. They can be widened slightly for a broader spread of power. Timing for MX works out best at 3.0mm for the 250, 3.5 for the 400 and 3.5 for the 501.

If you want to go bananas on the power, try the stage tuning until the engine starts to feel a little peaky for your skills. Then stop.

DESERT

The first obvious must for the Maico rider is one of two things: Get a skid plate or a high pipe fabricated. Of the two, the skid plate is the easiest.

Alloy rims are a must and cross-four lacing on the rear wheel will increase reliability—a must for desert racing.

Again, Curnutts or Konis, depending on rider preference, are the way to go.

One chronic Maico problem—namely that of motor mount bolts shaking loose—can be solved by replacing the standard ones with American bolts and liberal use of Loctite. Drill out the front mount hold and install a $\frac{3}{8}$ -inch American bolt.

A 3-gallon tank is the absolute minimum, as the Maicos consume gas at a thirsty rate. Three gallons should get you through a 50-mile loop, with not a whole lot of fuel left over.

The wide-ratio box works best for desert and should be left alone. Gear oil must be changed after every race.

A quick turn throttle seems to be the favorite.

Heavier fork oil than that used in MX is a must.

Gear tall and try to keep the engine at mid-range most of the time. At high r's, the vibration will tire your hands quickly. Shift early and let the engine work.

The frame should be cut approximately 5/16-inch out of the top frame tube. This will make the machine track like the proverbial train. It will not feel right for MX work, as the bike will then decidedly want to go in a straight line, rather than turn.

With this one simple frame cut, the Maico becomes an impeccable high-speed handler. It really makes a difference.

SCRAMBLES

If you're serious about scrambles, then Stage 3 is for you. Just make sure you can hang on and use the power. Tires, of course, will have to be changed to suit the track conditions, but the frame can be left stock.

Compression can be run up quite a bit, by taking .075 of the head and profiling to match the piston. Just remember, the more the compression is raised, the

higher the operating temperature will be. For short races, the sky is the limit. For longer events, don't go over 15:1 on the compression ratio, and make sure jetting is spot-on.

CZ

CZs are one of the most reliable and well handling out-of-the-crate race bikes you can buy. But the performance costs a lot, both in initial investment and sky-high parts prices. CZ makes two big-bore bikes, the 250 and 400. Both are very competitive, but they also have some weak points that need some work.

MOTOCROSS

On the 250, the stock Jikov 30mm is sufficient, but the 400 needs a 34mm Mikuni to work best. This change alone will give the 400 a real boost in usable power.

Match up the ports in both the 250 and 400 for best performance, but don't enlarge them. Liners are quite expensive.

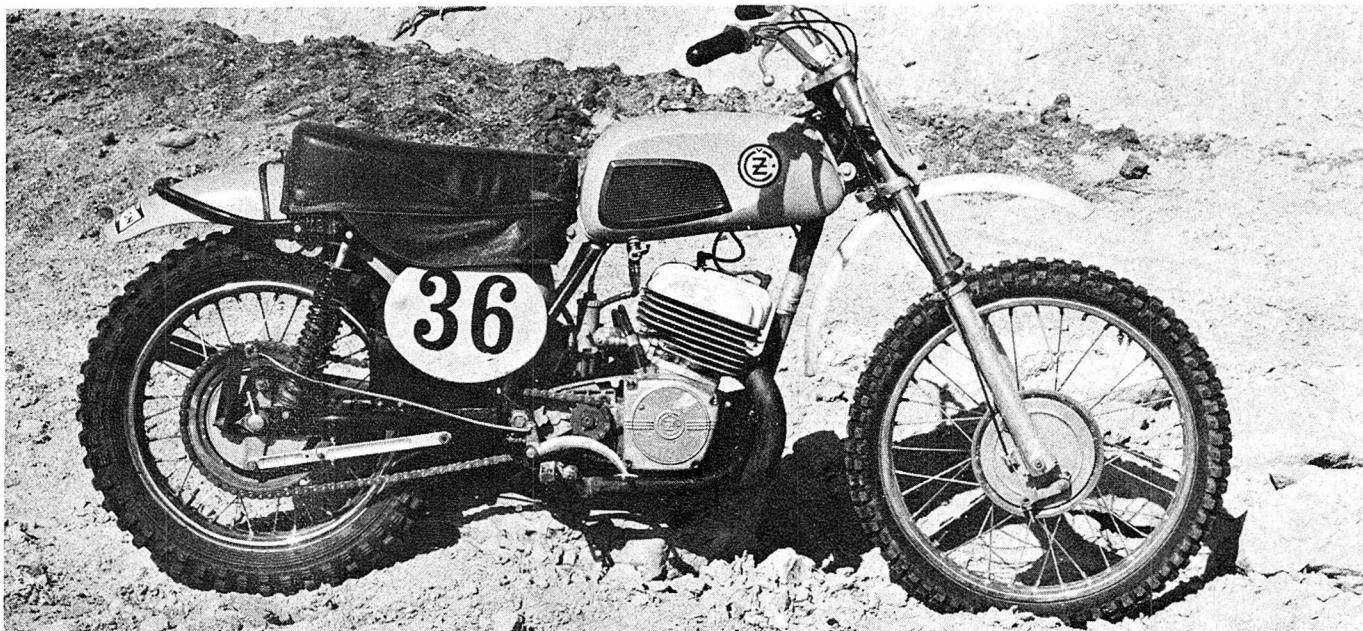
Timing on the 250 should be 2.6 to 2.8mm BTDC and 3.6 to 3.8 on the 400.

CZs have two spark plugs that fire simultaneously. The trick setup is to use a PAL 1417 in the front hole, and a 1415 in the rear.

Mid-Valley Cycles in Van Nuys, California, has a downpipe available that will give both the 250 and 400 more rpm and a broader power band. The stock CZ downpipes are sufficient for most riders, but they get battered by rocks and crashes very easily.

The standard CZ rear shock absorbers come with overly-stiff springs on them. Replace the springs with Girling 60-90 or 70-100s. If you are not satisfied with the stock shocks, replace them with Konis.

Replace the CZ fork seals with Honda or Universal seals. This is not an option; the change must be made, because the stock CZ seals are worthless and will spit oil all over the bike from the first downstroke.



CZs usually need wheel modifications and some electrical work, but are strong and fast in the engine department.

HOW TO WIN AT RACING

Stock gearing on the CZ is very good, but you might want to carry a 13- and 15-tooth countershaft with you in case you have to run at an extremely fast or tight course.

A CZ tank, full of gas, weighs 26 pounds. There is an accessory tank available from Big River that only holds a gallon, but also only weighs 10 pounds full. This is a considerable weight saving that should be considered by any serious rider.

Wheels and spokes are fine on the 250, but should be replaced by Akronts and 8-gauge spokes on the 400.

On both models, toss away the stock handgrips and replace them with Dohertys or one of the Doherty imitations that are available.

And, of course, keep a supply of rubber bands on hand to keep the CZ's rear brake returning properly.

DESERT

A high pipe and skid plate are almost necessities in desert racing. We'll take that back . . . a skid plate is always necessary, but a low pipe can remain as long as the skid plate protects it reasonably well.

Curnutt shocks seem to be favored by most CZ desert racers, but Konis, Girlings, and the stock shocks with 60-90s also work well.

The rear wheel takes a helluva beating in desert racing, so it is best to relace the wheel using the cross-four pattern. Use 8-gauge spokes and Akront rims. Use the biggest tires possible; a 3.25 or 3.50x21 on the front, and a 4.50x18 on the rear. Barum 6-ply desert racing tires are very durable, not only on the CZ, but on all big-bore desert racers. They don't flex as much on impact as a standard MX tire, though, and take some getting used to.

Carburetion should be the same as for motocross with the exception of the 400, which will accept a 36mm Mikuni for the sustained high rpm. Clean, match, and polish the ports and go to 3.6-3.8 on the 400's timing.

CZ's stock seat is swell for motocross, but some riders prefer to add some extra padding to desert CZs.

Nylon cables work best in the heavy dust at desert races.

Most desert riders prefer Castrol 20-50 in both the transmission and forks. Fork springs should be changed to 60-90 progressive Cerianis. Many motocross riders prefer the Ceriani springs, also. Ceriani damper rods are worth considering for the rough stuff.

Here is a trick that few desert riders know. CZ clutches get awfully hot while churning up long, sandy uphills. The springs often fail and collapse. Find a spring that has the same tension as the stockers, but is more heat resistant. Mid-Valley sells them for \$2.50, but they can probably be purchased elsewhere for less money if you are willing to play Sherlock Holmes.

SCRAMBLES

Not too many CZs compete in scrambles events, but there are a few riders who campaign the Czech MXers with a great deal of success. Here's how:

Change the tires to suit the track conditions. (This should go without saying.) Install an RPM pipe and jack the carburetion up to 36mm.

Widen the ports about 1mm, but don't get any wilder

than that or the rings will hang up in the ports. Set the timing on the 250 at 3.0-3.1mm BTDC, and 4.0-4.1 on the 400. Use a 15-tooth countershaft sprocket.

There are probably more trick goodies made for CZs than for practically any other bike, with the possible exception of the Yamaha DT-1. CZs are a little overweight if compared to the other scooters that they compete against, so there are plenty of titanium replacement parts available; even titanium fork springs if you really want to get esoteric. An excellent electronic ignition system is available from South Bay Motorcycles in Redondo Beach, California.

The phenolic block on CZ points wears rapidly. If your CZ starts to run poorly and start hard, check the point gap first.

CZ gearshift levers are way too strong and rigid, and don't bend easily enough in a spill. This causes the transmission to eat its lunch prematurely. Many riders graft a Yamaha DT-1 shift lever on to the CZ splines, or get a friend who likes to tinker with his band saw and welder to make a new one.

Older CZs with the red gas tanks and on into the early yellow models came with rigid footpegs that will demolish an ankle bone as fast as you can say "Vlastimil Valek." Throw them off the highest cliff you can find and install a sturdy set of folding pegs.

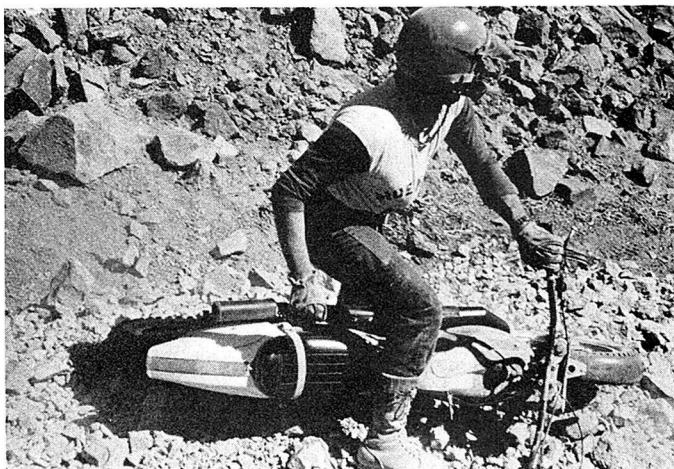
Here's another CZ tip. Keep the motor mount bolts, as well as all the rest of the hardware, tightened properly. Keep the engine timed. Keep the carb jettied right. And it will last forever. (Almost.)

OSSA

Ossa does not offer a big incher, but does offer a 250 and a 175 in several models. Of prime concern, here, is the 250 Stiletto. After checking with a number of Ossa specialists, we find that very little information was available. Most swear violently that very little need be done to the machine. What we could find out should prove interesting.

MOTOCROSS

The single biggest piece of trickery seemed to be that most of the tuners agreed on replacing the standard piston in the racer with a Pioneer piston. Seems it



Ossa also makes a bike that is well suited to scrambles, but occasionally you'll see them campaigned in the desert . . . with varying degrees of success.

offers more reliability, as well as giving a small gain in performance.

A thin head gasket is also used, giving a boost in compression. This pops it up to about 14:1. Any more, and the engines tend to detonate. We asked about retarded timing and a higher comp ratio, but could find nothing out as to the effects. Apparently no one has experimented in this direction at least to our knowledge.

Ports receive a general cleaning and polishing. Stock ports seem to be very well matched, but it never hurts to check each individual barrel out.

Timing should be set at 3.0 BTDC—this seems to be the best compromise for MX.

Konis replace the factory shocks and the 1-inch shorter swingarm seems to give the best results on a motocross track.

Pipe remains stock.

Pegs are usually lowered one inch, although some expressed a preference to as much as 1 3/4. Again, rider preference.

Metal particles are usually found in the forks on a new bike, and these must be removed or the forks will be destroyed. A few flushings with gas will do the job.

Full Bore Oil at a 28:1 ratio is recommended by most, for all kinds of racing.

DESERT

The frame is left alone for desert racing and no cuts and gusseting are normally used.

Konis or Curnutts replace the factory supplied shocks and a Filtron is a must.

Heavier oil, the weight depending on the rider's weight, replaces the MX-weight oil.

Again, no radical porting is utilized—just cleaning, matching and polishing for maximum flow. Footpegs get lowered about an inch and the rear brake is re-worked to go over the peg, instead of under. The low position lever is a rock catcher when depressed.

A must for the low pipe is a skid plate, but no reinforcing, other than a piece of angle iron is added to the chamber itself. The price of a decent skid plate is about \$25, and Hockies, in Torrance, California, has a good one.

A 3.25 or 3.50x21 front tire replaces the normal item up front, but the rear one is retained.

Timing should be set at 3mm BTDC.

Naturally, all nuts and bolts receive the super-stay-on treatment. Plenty of goop.

SCRAMBLES

The Ossa works best at scrambles and some additional ponies can be used here.

The drill is to use the thin head gasket for a compression boost. Hockies offers this to the riders for a mere buck.

For the high rpm work, a 36 IRZ carb replaces the smaller carb. The pipe remains standard, but some play with the stinger length for additional r's.

For smooth tracks, the most common rubber seems to be K-70s, with Perellis a good optional. Most of the riders run the fork tubes up an inch in the trees, to get that front end down to the ground a hair more.

This reduces rake and trail slightly, making the bike an easier slider on the smooth stuff.

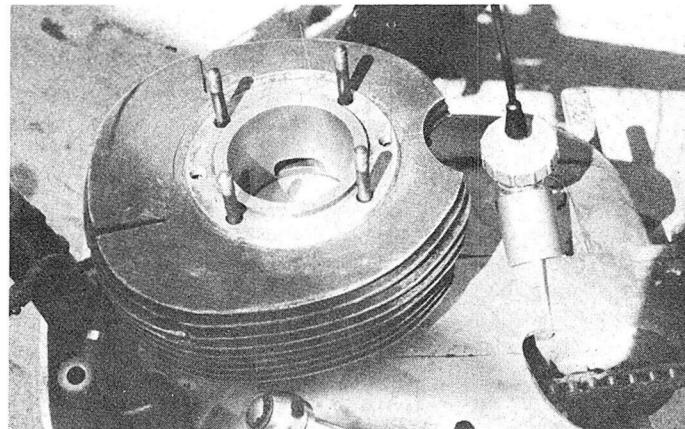
Footpeg height is left stock. Normal gearing is 12-53 but 11-52 seems to get the most out of the engine for normal racing conditions. Champion N2G plugs get the nod for spark.

BULTACO

Buls enjoy a reputation far and wide as being very fast, yet a whole bunch of hop-up info is available to the rider at the drop of a taco. The Pursang is their most successful model, coming in both an MX version, the Europa, and a scrambles version, the America. They also offer a number of smaller displacement scoots, which are also considered the bikes to beat on the faster tracks.

MOTOCROSS

The skinny front tire on the Bultaco is usually the first thing to go. Most riders find the 2.75 cross section



There are two schools of thought on carbureting Bultacos. The Mikuni carb seems to run cleaner, with less loading up.



Steve Rigen shows off his Bultaco Astro, an out-of-the-crate TT and short track rig. Claimed horsepower is over 40.

HOW TO WIN AT RACING

bites in too much. Most mount a 3.00x21 Pirelli or Nitto. A 4.50 on the rear also replaces the stock rubber the second it wears out.

Gearing is usually switched from a stock 12-48 to a 13-46 combo. Stock gearing is slightly too high for most MX work. This still leaves the rider with a solid 70 mph top end, more than enough for the job at hand.

Ports get cleaned up and enlarged, but timing is not altered. The bike is already pretty wild as is. Matching up is critical, as Bul barrels are notorious for being off and staggered.

Thought differs on choice of carbs—some stay with the Amal and go to a 36 or a 38 concentric, while others will use nothing but a similar-size Mikuni.

Pistons receive the old hacksaw treatment, if horsepower at the expense of low end is the route; 5mm off the intake side is sufficient. Timing should be 2.8 BTDC. With the addition of a trick pipe, the bike will now turn some serious revs. Steve's Bultaco offers a good tube for around 50 bucks. Van Nuys, California is the place.

When more power is dragged out of the engine, one extra should be added to the clutch, or a Barnett clutch dropped in its place. The Barnett will drag like a bear when cold, but holds up super.

Fork seals should be changed (naturally), because the Bul seals are scummy. They leak heavily in every direction. Ceriani seals, or the new Universal seals do the trick.

If the rider is hard on machines, then a gusset above the front top motor mount is a must—if for no other reason than to keep the bike in one piece. A desirable thing, we feel.

A number of Bul people informed us that Bardahl at 32:1 was the way to go on lubrication.

DESERT

There's an old saying among desert riders . . . "If a Bul will stay together, it's hard to beat." Then the emphasis for a desert 'Taco is on reliability, rather than speed.

A big tank is a must—3¾ gallons will squeak you through 50 miles. Maybe.

A solid aluminum skid plate seems to be the best, lightest protection to date. Cross-four lacing on the rear wheel is a must—if you don't do it, the spokes will fall like rain.

A 19, preferably a fat 3.50, up front is the natural choice for beating over the desert rocks.

Most desert riders drop one tooth on the counter-shaft sprocket. The 5-speed box still enables them to let the engine rest reasonably at high speeds.

At least 30-weight oil in the front forks is the drill; heavier if you're a heavier rider.

Thicker saddles are a must for the Bul rider. The stocker is marginal, even for MX.

The Amal is usually replaced with a Mikuni, but not a huge one. 32s and 34s seem to be the most suitable. Curnutt shocks, or Konis, usually replace the old ones.

SCRAMBLES

Bultaco is the bike to beat at scrambles. Their emphasis on horsepower is the reason. Out of the crate, a Bul America is hard to beat.

All of the same things are done to the machine like

the MX treatment, plus a tad more. The exhaust is raised 2 to 3mm and the intake lowered 2 to 3mm. Timing, strangely, remains stock. This, of course, depends on the model. Check with your local Bul ace before you get out the grinder and start digging holes.

When rebuilding, most shops that care install American bearings for greater reliability.

A really hungry rider will install a giant 38mm Amal and an rpm pipe. Needless to say, the low end goes away, but the peak power goes up.

Most of the people we quizzed do not recommend reed valves or pumpers for their bikes. Seems that it helps low end at the expense of breathing on top.

YAMAHA

If all the Yamaha DT-1&2 and RT-1&2 MXs in the country were lined up, and all the riders dumped the clutches simultaneously, the earth's direction of rotation would be reversed. There're that many of them.

The DT and RT Ones were Yamaha's first effort at building box-stock motocrossers. They were sturdy machines with bulletproof engines, but sadly, didn't handle quite right. Basic mods for the 250 and 360 MX were different shocks (Koni, Girling, Curnutt, or Maverick), and the installation of a replacement fork damper assembly.

More venturesome owners cut the frame to lower the engine and bring it back an inch or so.

Yamaha's latest plunge into the profitable world of motocross is the DT-2/RT-2 MX line. Though only recently introduced, tuners have found that there is a lot of power lurking in their mass-produced hearts. The bikes handle a lot better than older Yammies, too. Below is a list of changes to the DT/RT-2 MX that successful Yamaha riders are performing.

MOTOCROSS

When the DT and RTs are brand new, several things must be checked or changed. Check the oil pump to



Older style Yamaha MXers needed much work to become even remotely race ready—from the frame on up.



Newer Yamaha racing machines are a huge improvement over the previous offerings, but still aren't perfect.

make sure that it is adjusted properly. Or just remove it and use a pre-mix instead. Drop the needle one notch on both the 360 and 250. Main jet should be dropped one on the 250 and switched from 370-340 on the 360. These jetting changes are for altitudes of 0-1,500 feet.

Before the bike is even fired up, torque on the head bolts must be checked. Back off the head bolts a couple of turns, and then torque them down to about 35 pounds. They *must* be backed off before torqueing or the torque wrench will get a false reading, because the steel bolts seize slightly in the aluminum castings.

Remove the air cleaner element, and after making certain that it is oiled properly, seal both ends with grease. Reapply the grease whenever the element is removed.

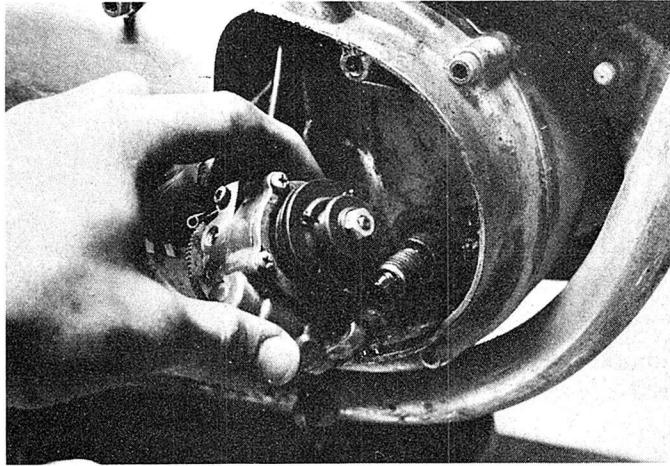
Engine mounting bolts must be kept ultra tight *always*. This is critical on all bikes. Same with the spokes; they will seat in after a few minutes of riding and should be checked, and tightened if necessary, frequently.

The silencer that comes with the MX line is not straight through and should have the baffle punched out. Put a steel rod in the silencer. It will stop when it hits the baffle plate. Take a giant hammer and whack the end of the rod until the spot weld holding the baffle breaks. Shake the detached plate out, and remount the silencer. You'll be amazed at the difference in performance.

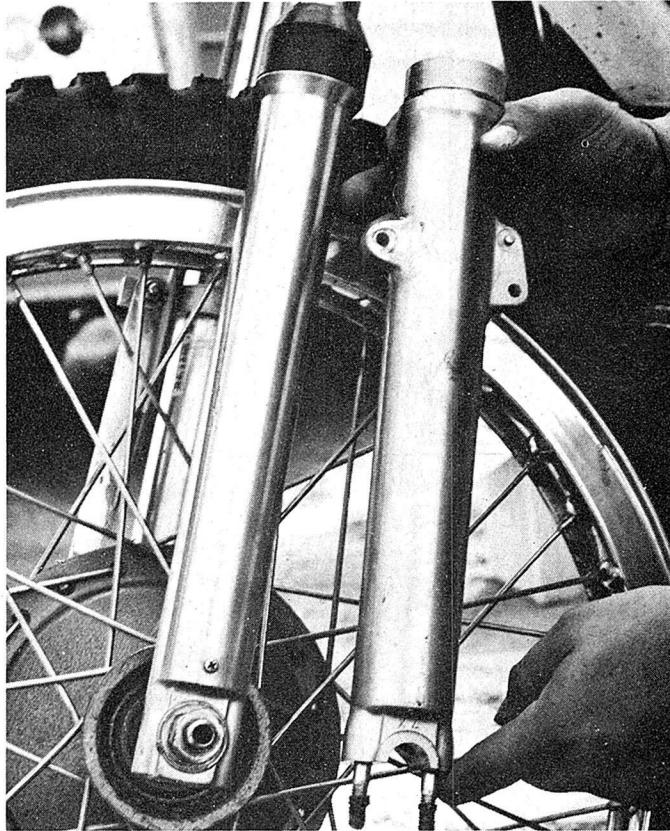
Most riders find that the rear shocks are too stiff. Little can be done to alter them, so it is best to replace the shocks with Girling, Koni, etc. Front suspension is basically good, once the fish oil is drained and good ol' American oil added.

The RT-2 MX has a very disconcerting problem. Occasionally, when the kick starter kicks back, the force of the blast will break the motor cases. The RT has electronic ignition with no flywheel, so it is very feisty and tends to kick back often.

A compression release is needed for starting purposes only. Here's a cheap solution: Buy an inexpensive $\frac{1}{2}$ -inch reach compression release. Braze shut the two outlet holes, and drill one of them back through with a $\frac{1}{16}$ -inch drill. When the unit is mounted, it will act like a 400/501 Maico start release, and prevent



Most serious racers still remove the oil injection from their Yamahas, even on the newer models.



A popular modification on the older-style Yamaha forks legs is a slimming down trip to the lathe.

the bike from kicking back. (Note: The RT head is designed for $\frac{3}{4}$ -inch release, but for starting release only use a $\frac{1}{2}$ -inch release.)

Engine performance can be brightened up a little if the ports are cleaned and matched, and the exhaust port polished. Time the 360 at 2.3mm and the 250 at 2.6-2.8.

The DT has a conventional magneto ignition system . . . with a flywheel. But the RT has electronic ignition with no flywheel. The lack of the added weight of the flywheel makes the bike's handling squirrely. The power is unmanageable. Serious RT-2 MX riders are replacing the electronic ignition with a magneto arrangement, just so they have the advantage of the flywheel's weight.

DESERT

For desert use, all the above tips will apply. You can further strengthen the wheels by cross-wiring the spokes. Skid plate and larger gas tank might also be needed. Carburetor size can be increased an extra 2mm for sustained high-speed running.

SCRAMBLES

Slide the fork legs up in the triple clamps to lower the front end. Increase the size of the carb if you wish, because you will be looking for better top end power, even if it has to be obtained at the expense of bottom end torque. Gearing and tires will have to be selected to fit the course.

KAWASAKI

Except for the incidental hardware and top-end specifications, the Kawasaki F81M and F9 are fairly identical machines. The 250cc F81M is sold as an out-of-the-crate racer and can be competitive once the obesity problem is cured. The 350cc F9 has proven to be a reliable machine in the desert with a minimum of preparation, compared to some of the other Japanese motorcycles.

MOTOCROSS

For some reason, Kawasaki chose to stock the 250 with trials-type tires. Put some knobs on it unless your first race is going to be a Grand Prix.

In an unmodified state both bikes handle surprisingly well, all things considered. You can make individual adjustments of the Hatta forks, but when you do this always act as if you know exactly what you are doing to save some embarrassment.

Damping can be improved by installing the Webco damping-improving kit for Kawasakis. Or, if you want to do what the insiders do to save money, try this:

Liberate the damping tube from the confines of the front forks. Drill a 3/32-inch hole through the tube, 1½ inches up from the very bottom. Then drill another 1½ inches above the one you just drilled, at a right angle to it. Now put the forks back together and go for a spin. Like a Cadillac, no?

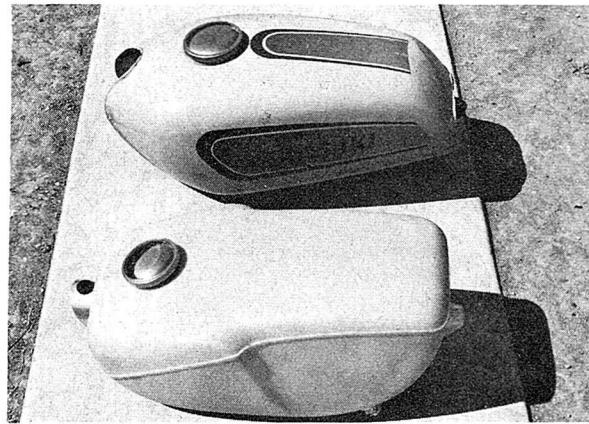
Lighten up the 250 and 350 by replacing the heavy steel gas tank and fenders with glass and plastic items. This will put the F81M close to the same weight category as most 250 racers.

Lighten the 350 by throwing away all the lights, horns, turn signals, and everything else you don't absolutely need. Take the time to saw, file, and paint over all the protrusions the aforementioned garbage was attached to.

If you want to lighten the front end of the Big Horn, remember that the lower fork legs from the F81M are 2 pounds lighter and will bolt right on.

Kawasaki recommends that you don't fool with the porting unless you plan to get into blueprinting. You can help out the breathing by removing a chunk of cylinder that hangs into the intake tract. If you try to alter the exhaust ports on an experimental level, though, chances are you'll hinder the flow pattern before you help it.

Put the rotary valve from the 250 onto the 350 and get an instant increase in power. Ask your dealer for the Big Horn's Speed Kit.



Most of the changes made to the Kawasaki line are weight saving switches, such as replacing the heavy tank with a plastic unit.

Webco has some fork wipers that work much better than the stockers. Get those and your seals will last longer.

Whatever you do, put a good air cleaner on it. Now.

DESERT

Do the same thing as for motocross.

Replace the tanks, like we mentioned earlier, but make sure you get a generous-size one because the Kawasakis have a reputation for being thirsty boogers.

If you would like the swingarm lengthened on either bike, here is the quick and easy way: Ask your dealer for a Mach III swingarm. It is an inch longer and it bolts right on.

Many desert riders are using the stock Kawasaki pipe on the 350, spark arrester and all. Leave it alone and you'll have a quiet, reliable, competitive Kawa.

SCRAMBLES

As far as engine-spiffing goes, read the motocross section. Also, you can experiment with the rotary valves to get peak horsepower out of the motor. If you ruin one it can be replaced cheaply.

MONTESA

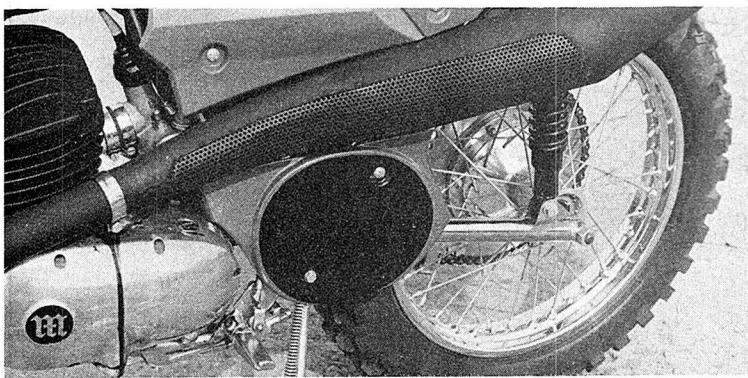
Montesa carries a limited line of racing machines, having dropped the 360cc version some time ago. Concentration is now on the new 250 and the 125. Not too much has been done to the 125, due largely to its newness, but the 250 has been around for some time, in pretty much the same form that it is today.

There have been some refinements, like the new ignition system, but the powerplant is basically the same unit as in years past. Still, not a great deal is done in the way of engine modification. Several people we contacted said that tampering with the ports results in nothing but trouble. Standard porting is slightly on the radical side.

MOTOCROSS

The 250 comes with a rather high compression ratio, 12½:1, and attempts to raise the compression much higher have resulted in overly high engine operating temperatures.

The most common modification seems to be the removal of the Spanish Amal carb, and replacing it with



Montesa offers their engine to the racing market in two different frames. This one is housed in a Rickman assembly.

a 36mm Bing. For MX, 36 seems to be the optimum venturi size, and loading up is a problem with larger carbs, and a drop off in low end performance.

A Filtron is a must, and some riders fabricate their own still air box, but a Maico unit can be adapted with very little hassle. Very few riders stay with the stock shocks; they simply aren't up to the task—and hang on Konis or Curnutts.

Montesa bars are made from very heavy metal and come in at a hefty $3\frac{3}{4}$ pounds. Titanium bars are a popular conversion, weighing a feathery $\frac{3}{4}$ -pound.

Many other areas on the Montesa come under the watchful eye of the scale for the serious rider. Almost every bracket on the machine, including fender brackets and brake stay arms, is constructed of a too-heavy metal. Just going around the bike and replacing these parts with lighter aluminum pieces, can easily save the rider 15 pounds.

No tampering is done to the frame. Attempts to cut the neck for increased rake have screwed the handling up.

No port changing is done, other than cleaning, matching and polishing. Ports can be widened slightly, but care must be taken. Too much (more than 1mm or so) and the rings tend to snag.

DESERT

For desert, the long swingarm gets the nod and, of course, some good shocks. Heavier springs from the old 360 replace the stockers for desert work and a fat 19-inch front tire is installed. For extremely heavy usage, cross-four lacing and 8-gauge spokes should be employed.

The MX saddle is too thin, and usually receives some heavier padding.

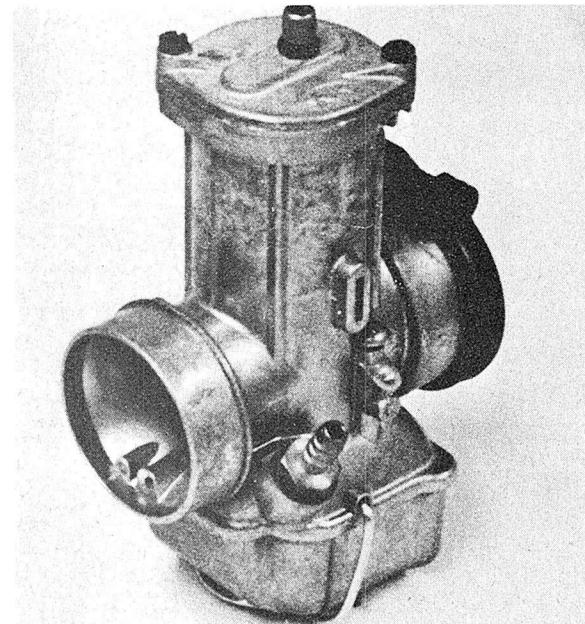
Seals in the front forks are replaced with the new Universal-types (on all models for all types of racing).

A big tank is a must and either the 3-gallon King Scorpion tank, or a $3\frac{1}{2}$ -gallon special desert tank (\$55.00) is installed.

Not much is done to the engine except for cleaning and matching the ports. No widening is done, and timing is usually dropped to 2.75mm instead of the normal 3.0mm.

Seems to help the low end slightly. A 36 Bing is also a desert favorite, although some riders have successfully used a 34 or a 36 Mikuni.

Standard gearing is 12-56 and most riders are happy



Most Montesa tuners agreed that the Bing carb worked much better than the standard Spanish Amal carb. No big surprise.



The Montesas lend themselves best to smooth, fast tracks and scrambles. Some of the older 360s were used in the desert.

with 12-50 for normal desert conditions.

Champion L3G, L2G or Autolite AE603 seem to hold up longest for desert conditions.

Again, a Filtron is a must.

SCRAMBLES

No change is made to the chassis and the normal swingarm is retained. The forks, however, are run up an inch higher in the triple tree. Most riders go to a very heavy oil in the front forks for scrambles, some as high as 90-weight. They swear it does wonders for steering accuracy.

Lightness is critical in scrambling, so as many parts as humanly possible are replaced with lighter ones, and axles are drilled.

Tires are changed to suit course conditions, but most riders scrambling on Montesas seem to prefer Perellis.

In place of the normal Amal, riders use either the popular replacement 36 Bing or a 38 Mikuni.

Compression is left stock.

Timing can be advanced quite a bit, but the more it is advanced, the more low end the rider loses. Most agree that it is not worth the deviation from stock timing, unless the track is ultra-fast.

HOW TO GET SPONSORED



When a motocross rider begins to win regularly, he thinks about sponsorship. The path that he's followed to get a room full of trophies is paved with gold. His gold. As a winner, he might be able to pick up machines and technical support, as well as some pocket cash, from a motorcycle distributor. But how good do you have to be to get a distributor sponsorship? What will your benefactor give you and expect in return?

It costs a motorcycle distributor about \$7,500 to support a rider, two bikes, and the parts necessary to maintain the bikes. That's a chunk of cash. You can see why most companies only support a few riders. If, for example, a distributor gives three guys a free ride, the total

yearly cost would probably be in excess of \$20,000. In order to justify such an expenditure, he has to be fairly well assured that the promotional value of the undertaking will return at least that much money in sales.

OK, you think you're a good enough rider to deserve distributor sponsorship. You approach your choice meekly, with helmet and Jofa in hand. This is what he'll ask you:

Are you fast enough to beat the guys who are currently winning?

Do you win or place well consistently? A guy who wins on one Sunday, gets a fifteenth the next, and then maybe a fourth or fifth is usually not good enough. You must be a steady rider. If you're the Banzai type, make sure that you learn to charge without crashing. Look at the guys who are currently being helped by a distributor. They always finish well up in the overall results. They want to win; second place isn't good enough.

Do you have enough mechanical ability and savvy to maintain your own bike? This is a point where sponsors differ. Some require that you, or a mechanic that you provide, do all the maintenance on the machine. This may include heavy-duty stuff like bottom-end jobs. Others will take care of the big jobs and leave the routine penny ante wrench turning to the rider. A distributor would dearly love to mother-hen the bike that he gives you, but his shop time is usually spent on warranty problems and building bikes for money. You can, of course, count on extensive technical information.

Another factor influencing the requirement that a rider be a good mechanic is the fact that when they break, machines are almost always at the track on race day. If such a problem occurs, the rider must be able to provide a diagnosis and cure to avoid a DNF. Racers who push their broken scooter into the weeds and stomp off don't make a very favorable impression on motorcycle distributors. Remember, it's a seller's market, and you just might be a buyer.

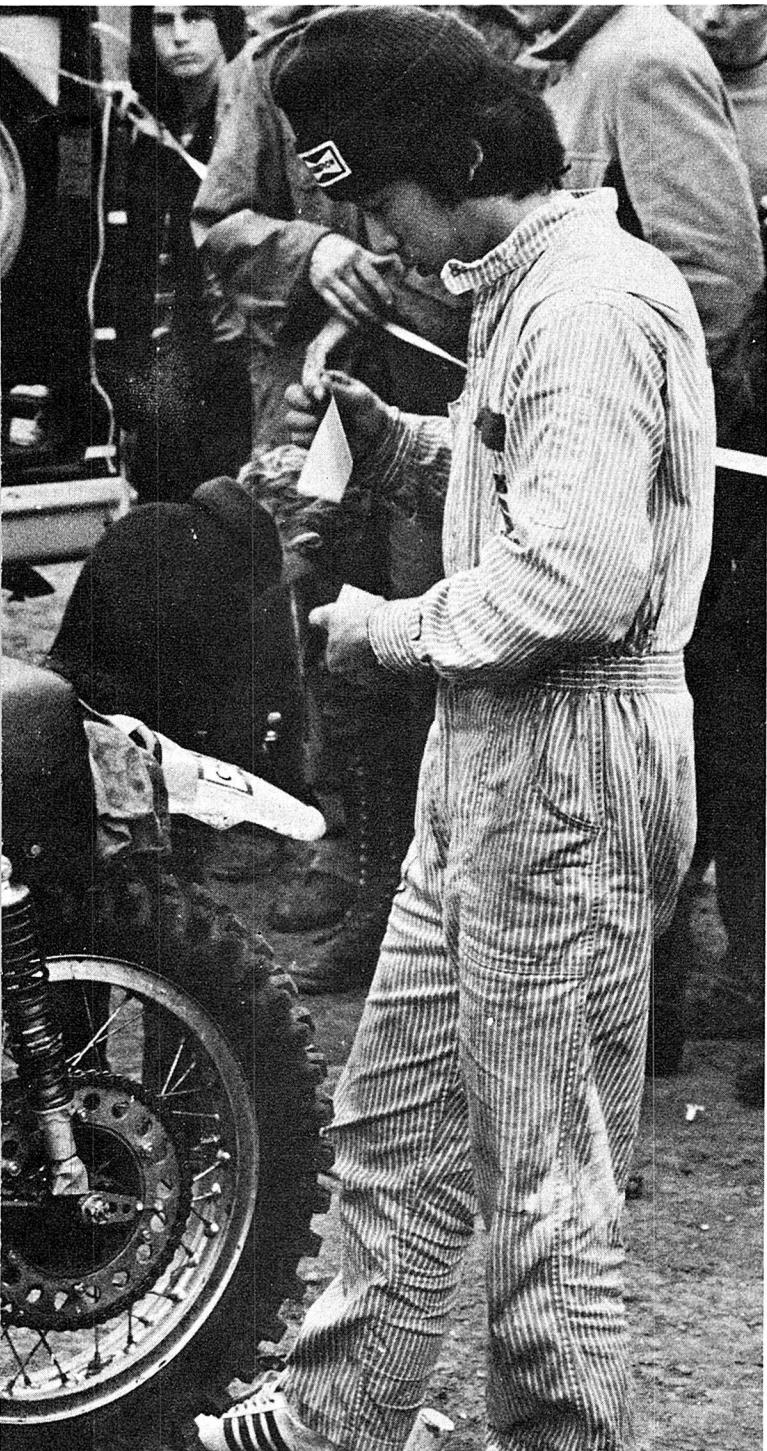
Are you loyal? Contracts are often worthless in the motocross racing business. If two parties have a contract and either of them loses interest, they don't perform and there is nothing that either can do about it. This goes for both the sponsor and the rider alike. The relationship between the two parties should be close, and all problems should be discussed up front before they lead to irreconcilable differences. Be loyal to your sponsor and he'll be loyal to you (maybe). Racers who jump around from bike to bike are generally pretty high on a prospective sponsor's "Don't Touch" list.

Are you willing to undergo the training necessary to be competitive? Distributors don't ask you to go to extraordinary lengths to stay fit, but 24 hours a day of television, cigarettes, and french fries don't make it either. Forget it if you're not interested enough to maintain your body.

IF YOU CAN ANSWER the preceding questions affirmatively, you might be a good prospect for distributor sponsorship. What will he give you in return?

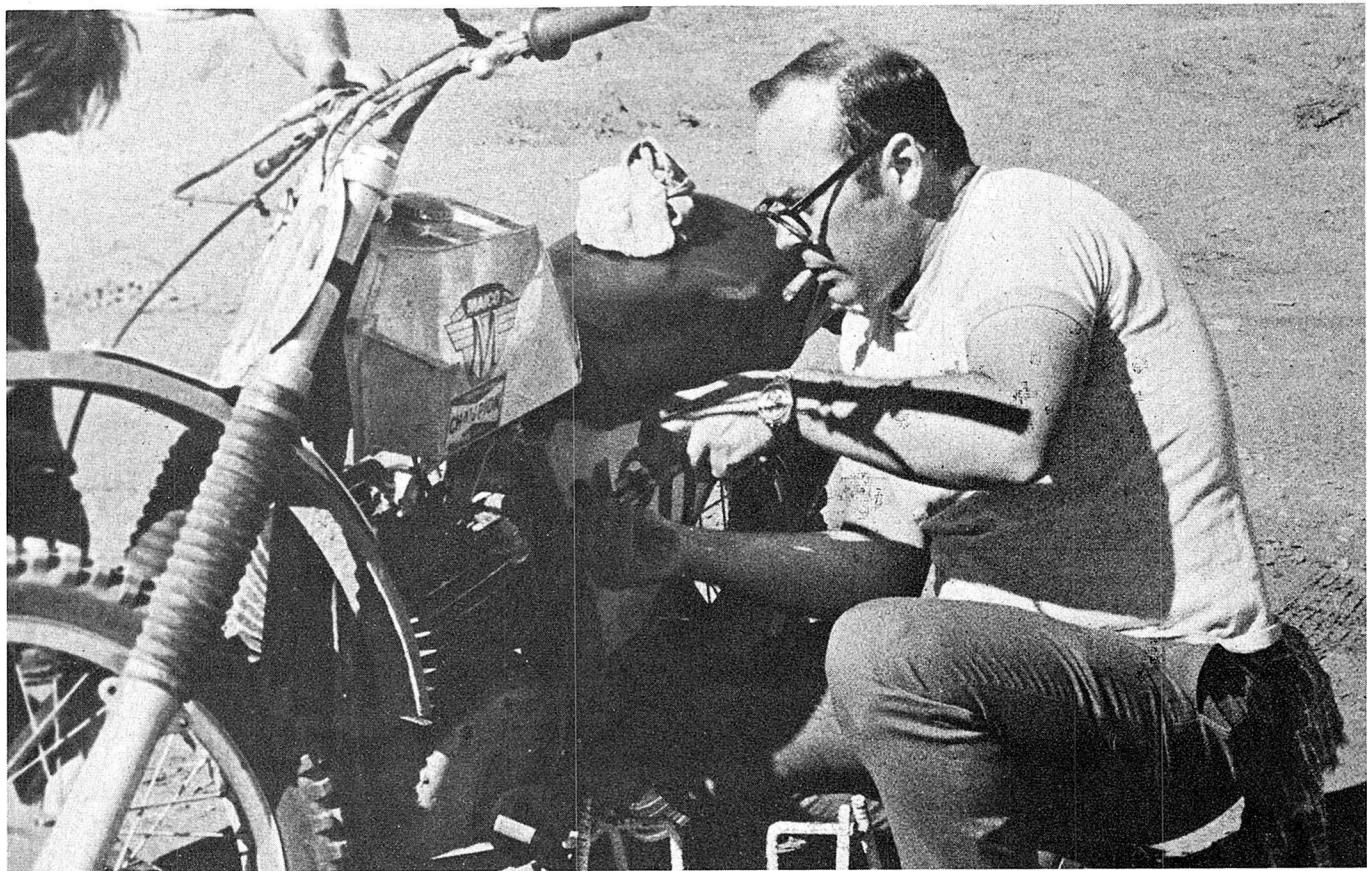
First off, you'll get one or two bikes, tricked-out to

A sponsored rider enjoys the best equipment and all of the latest factory trickery. Sylvain Geboers worked long and hard to earn his factory rides—it doesn't come easy and you must prove yourself first.



Tom Brooks (63) rode the Mint 400 for the Carabela distributor, while Mike Sixberry, the rider that Brooks is about to pass, picked up a private sponsor.





Brian Fabre, general manager of Cooper Motors, adjusts Maico team member Werner Schutz' carburetor.

a degree that fits the sponsor's pocketbook and methods. Again, this will vary with each manufacturer. Some like to keep the bikes reasonably stock so they can advertise your accomplishments without guilt. While others might give you a machine that bears little resemblance to a stocker — and still herald your wins with a straight face.

Motocross bike distributors often use their sponsored riders' bikes as a testing ground for new parts or ideas. Be prepared to try out something new occasionally.

Riders usually get replacement bikes as often as their riding style and the manufacturer's finances warrant. Parts, more often than not, are free. By the way, if you want to lose your ride in a big hurry, get free parts for all your buddies who ride the same make bike.

A rider can pick up cash from either a salary, consulting fee, or bonuses, usually a combination of the three. When a distributor puts you on the payroll, he might be liable for any injuries that you cause with his bike. The salary became instantly passé a while back when a manufacturer's rider creamed a kid who was going the wrong direction on a track. There's still a few hundred thou up in the air from that incident, so the distributors prefer to use a different method of remuneration, hence the "consulting fee." Many riders work at their distributor's shop during the week to further confuse the outsider who is trying to figure out who gets paid how much for what.

Every distributor handles the financial affairs between himself and the rider with a good deal of secrecy. What actually goes on doesn't generally get past the gray-haired granny who writes the checks. Bonuses for winning are common, and the amount is usually commensurate with the importance of the event.

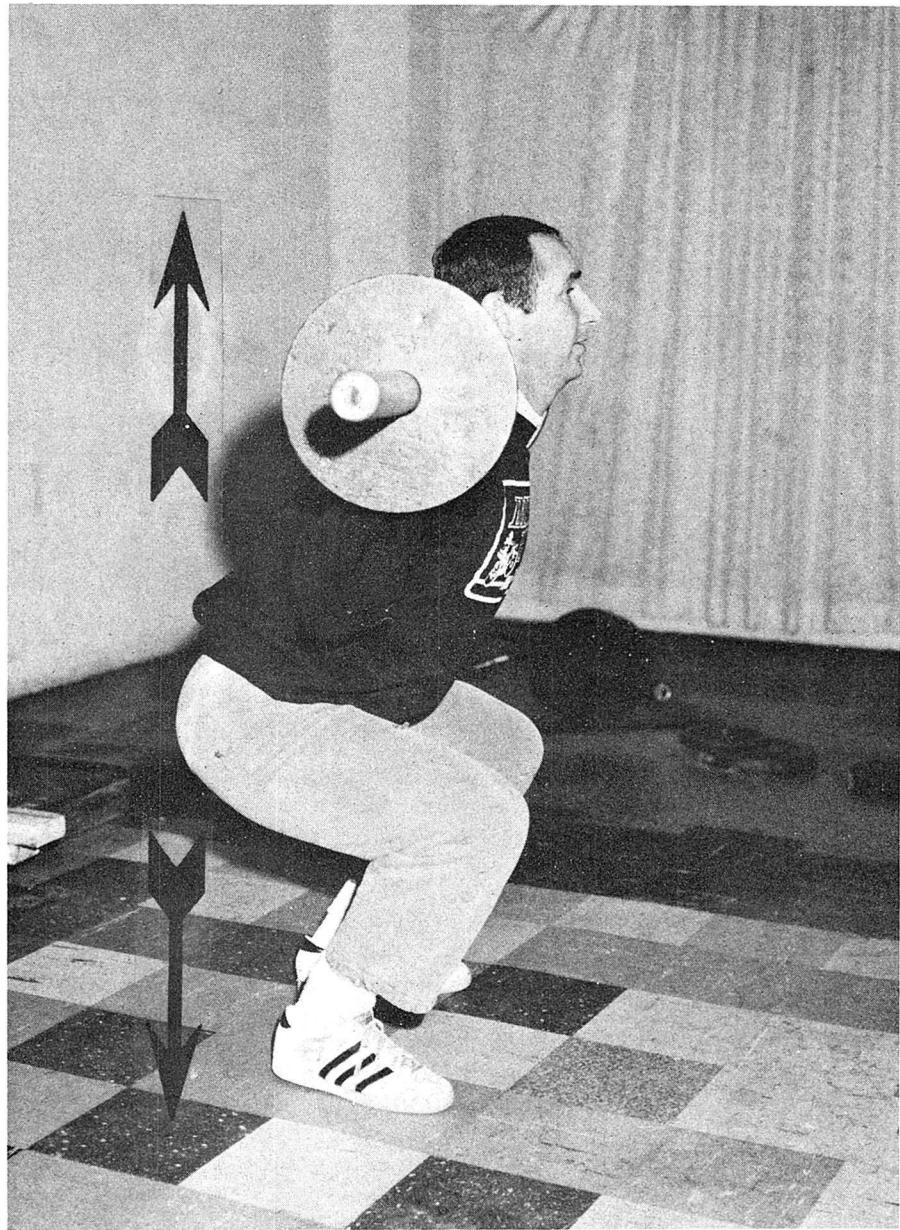
Some of the minor details of the sponsor/rider agreement are when and where the guys race, who pays the entry fee, and if the sponsor gets a cut of the purse. These matters are usually handled by a previously arranged policy, or may be flexible to allow change as circumstances change.

Do you have to live in Southern California to be a distributor-sponsored rider? It helps. Most of the manufacturers are headquartered in California, and it's convenient to have your riders nearby. The competition in California is the stiffest in the country. A good showing there has considerably more promotional value than a win elsewhere. There are three weekly cycle newspapers in Southern California to let the people know who won what, and more importantly, what he was riding. But don't despair if you live in another part of the country; geographical boundaries fade as your skill increases.

Full sponsorship is available to only a fraction of the really fast riders. Most distributors help deserving riders by providing part of their expenses. This may take the form of discounts on bikes and/or parts, and technical help.

Sponsorship through a local dealer is the way most of the guys get help. Dealers can provide a full range of gratuities to a rider, from free spark plugs to new bikes. The terms of such sponsorships are usually more nebulous than a distributor deal and may involve itself more with personality than ability. If you're a fast rider, approach a dealer and discuss the possibility of him helping you. Some of the country's fastest riders fly dealership colors. A good record as a dealer-sponsored rider does wonders when you go after that pie-in-the-sky — a distributor sponsorship.

HOW TO GET IN SHAPE FOR RACING



SQUATS (DEEP KNEE BENDS). Use a light weight and sink slowly to a level position. Rise and repeat until legs are thoroughly worked.

Dirt racing is not an easy sport. If a potential racer is not willing to get tired and work up a sweat, then he might as well turn to sail boats, chess, or crossword puzzles to get his jollies.

All the top desert and motocross riders are in super physical condition. They have to stay in better shape than many professional athletes, simply because the sport requires so much strength, stamina, and instant reflex action. Once a rider is in shape, he can usually get along well by just riding a couple of times during the week in addition to the weekend races. But getting in shape and being in shape are two different things.

When an aspiring motocross, desert or scrambles rider starts out in competition, he will have to work at increasing his physical capacity just as much as he works at increasing his riding skills.

The approach to tuning your body to the demands of racing is dual. You must learn to eat the right foods to allow it to adjust to your new activity, and you must make an effort to build the muscle groups that do the most work in dirt racing. Let's start with physical conditioning.

FOR RIDING A DIRT BIKE, three areas must be considered: general overall condition, lower body (legs, calves and haunches), and arms (including forearms and hands). Any shortcoming in any category will detract from the rider's ability to hang on when the going gets rough.

General overall body conditioning is perhaps the easiest of the three to do something about. Dirt riding it-

self is a great conditioner and, combined with minimal exercise, will round out a rider in quick time.

Running a few days a week, or indulging in jump squats should get the respiratory system (lungs) shaped up. If there is no place to run in your neighborhood, you can still do running in place.

A shortcut (running is boring) is available. If there are any stairs in your house or apartment, they can be used to concentrate an hour's worth of running movements into 10 minutes of exercise.

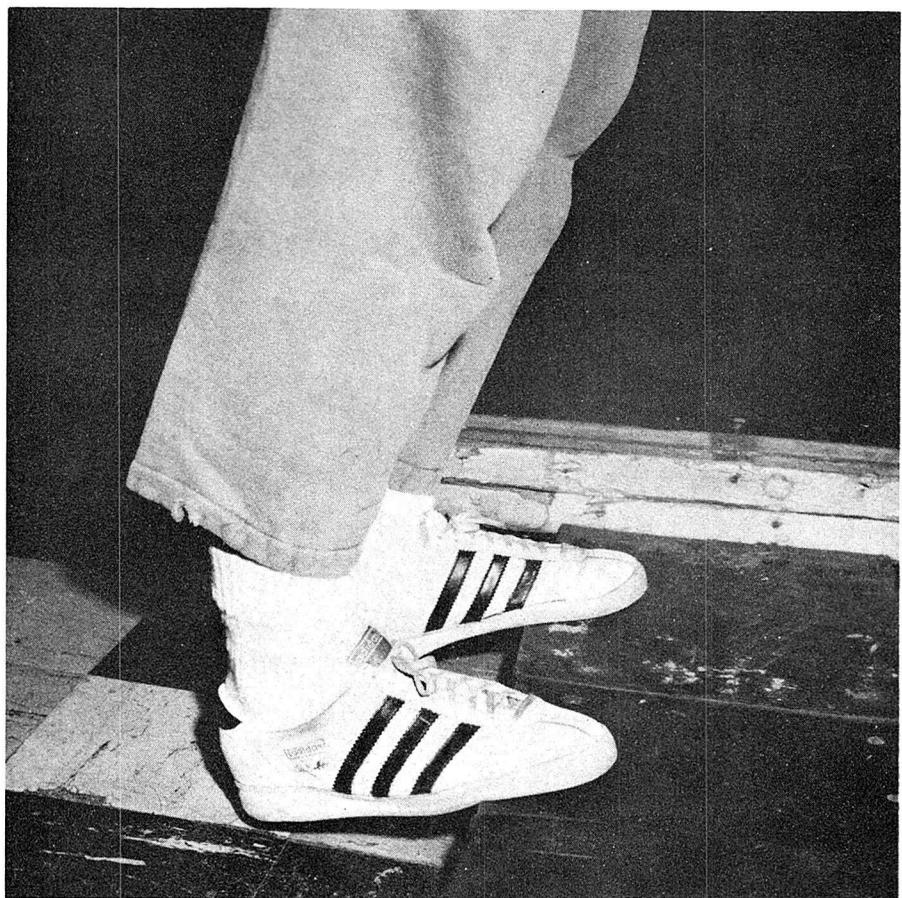
Take a light barbell for starters, and place it on your shoulders. Make sure the collars (retainers) are on good and tight. Hold it lower than the nape of the neck for maximum comfort and keep a firm grip. Then run briskly up a flight of stairs, turn around and walk slowly down. Immediately after reaching the bottom, run back up again. Repeat until the sweat flows. It shouldn't take more than 10 minutes of this to get the lungs working like a five-mile run. Your legs will be burning from the exertion. This means that you *are* working. If they don't burn, you are not working hard enough.

After two weeks of this (two or three times per week), your system should be in excellent shape. A word of caution: The first few times this exercise is attempted, have someone stand by as a safety man. The exercise is so strenuous, dizziness is a possibility, especially if you are a heavy smoker. If you don't have a set of weights, this exercise can still be done effectively with no weight at all. It just takes a bit longer.

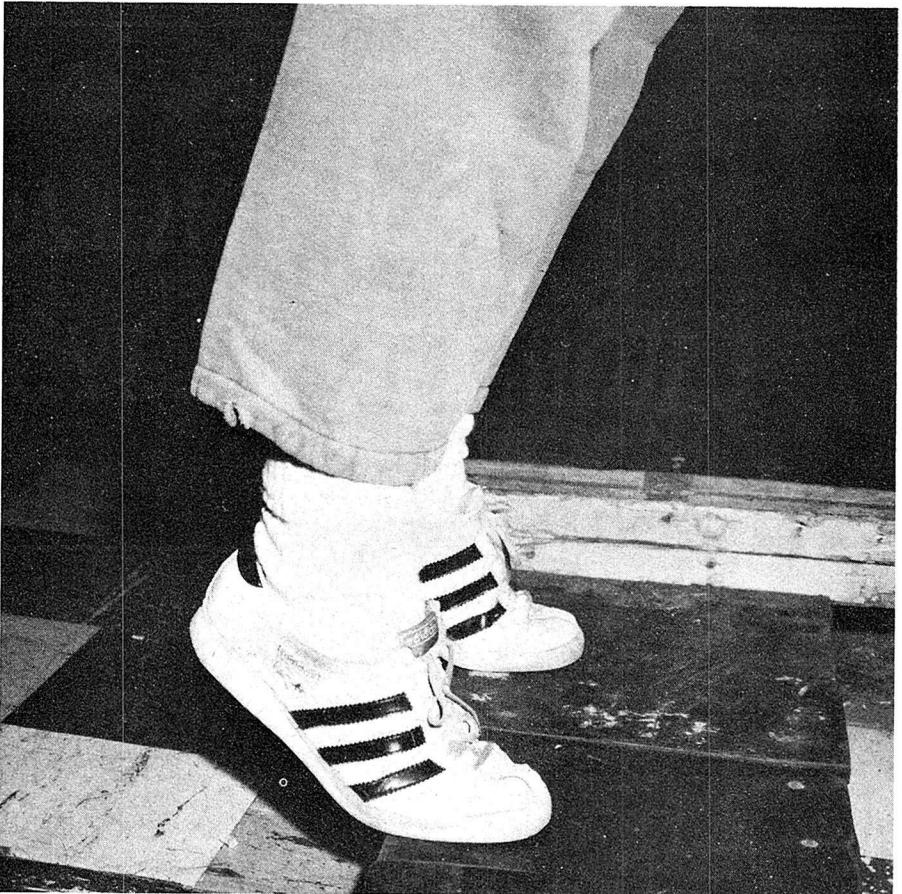
After you have gotten into some semblance of condition, you are then ready for the specialized exercises. The smartest bet is to split the workouts up into two sections. A good routine would be: Monday — Legs; Tuesday — Arms and hands; Thursday — Legs; Friday — Arms and hands and Sunday — Go riding.

As you can see, this routine is staggered in order to give some needed rest for the body sections that have been worked. You will make much better progress if that rest period is included. The surest way to "burn out" is to overwork. Working out every night, with no rest periods, is the quickest way to lose enthusiasm or go stale.

Out of the following leg and lower body exercises, pick the ones that



CALF RAISES. Use tennis shoes or bare feet and stand on a raised surface. Move slowly up and down, contracting and extending calf muscles.



HOW TO WIN AT RACING

suit you best. Two different exercises per session should be more than enough, if you work hard:

1. Squats (Deep Knee Bends)
2. Calf Raises
3. Jump Squats

ARM AND HAND EXERCISES

Rather than isolate on one or two exercises, it would be a good idea to vary hand and arm training as much as possible. Do a few each training session, but do different ones each time.

Gripping power is the hardest thing to improve, because we use our hands and arms every day and never learn how to really push these muscles to their extreme limits. These muscles *must* be worked until they burn, and then some.

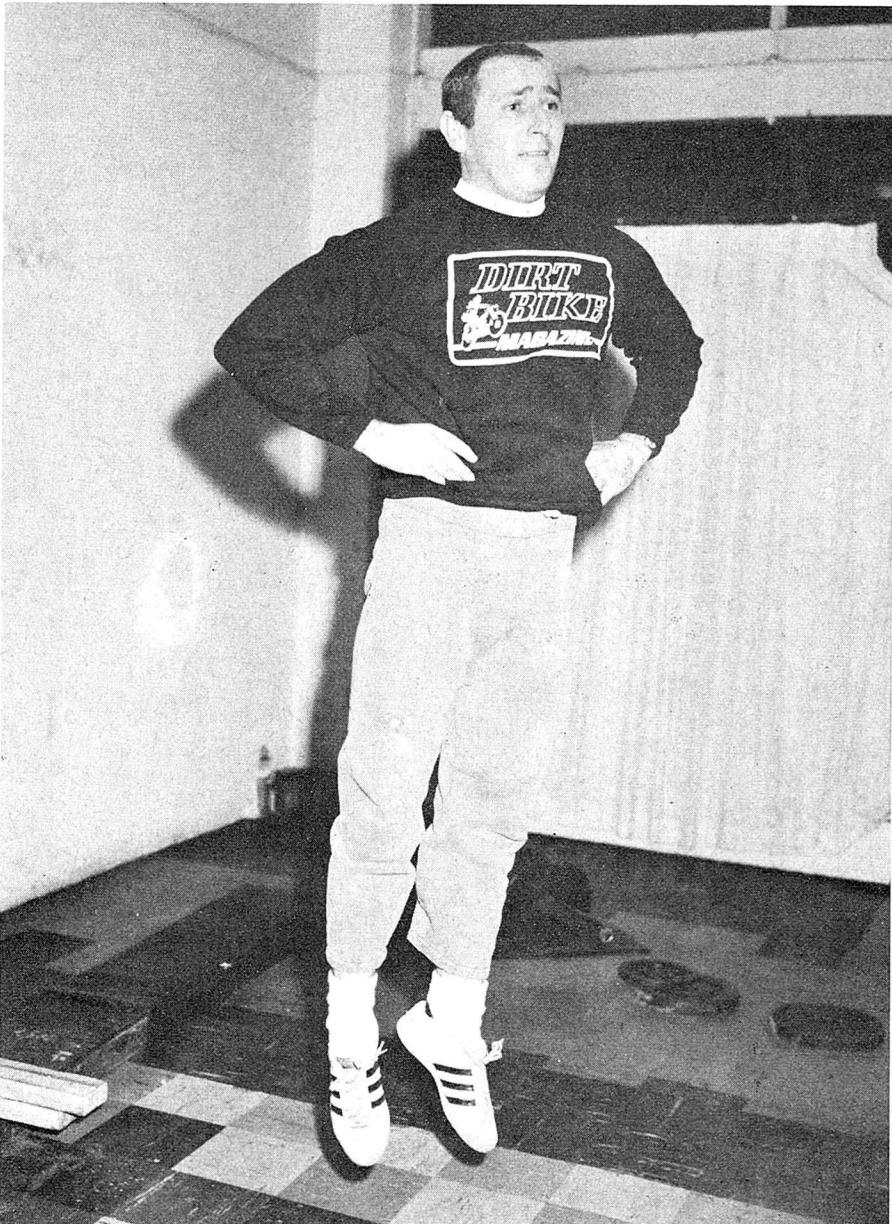
5. Barbell Curls
6. Bent Over Rowing
7. Chin-Ups (or Stationary Hanging by the Hands)
8. Wrist Curls
9. Broomstick Roller
10. Paper Squeeze
11. Hand Gripper
12. Finger Book-Lift
13. Pinch Grip Lift
14. Zottman Curls
15. Finger Tip Push-Ups
16. Power Cleans (*this one is a real toughie!*)

A sensible use of these exercises will get even the most out-of-shape rider back to rock-hard shape in four to six weeks. One word of caution: before attempting any of these exercises, warm up thoroughly to prevent any cold muscle injury. A few jumping jacks or running in place for a minute is enough. And for God's sake, when you're through, take a shower.

BASIC NUTRITION

While you are exercising and racing, your body requires a lot more food than it did back when you used to look at those pictures of Torsten Hallman and dream. You are a racer now, and if serious, you are also an athlete.

The nutrition requirements of a person engaged in a sedentary or even semi-strenuous occupation are only a fraction of what the athlete racer's body requires. Very few people are aware of exactly what has to be done to keep his body supplied with all the nutrients necessary to pursue an active sport successfully. Sure, we've all heard about the three



JUMP SQUAT. This movement is performed the same as a squat, except that no weight is used and one must leap high into the air after each extension.

squares that we're all supposed to eat every day, but it goes a lot further than that.

Knowledgeable people have discovered that it is virtually impossible to obtain all the needed nutrients to supply the body from the average daily diet. Research, primarily foreign studies, are showing that persons who place above-average demands on their bodies need more than the minimum daily requirements of vitamins, minerals, proteins, and so forth.

It is becoming obvious that the standards set by the federal government do not apply to everyone, certainly not to athletes who put 300 to 400 percent more stress on their

systems than, say, the business executive. And the standards have not kept pace with the changes in research findings. The minimum daily requirement (M.D.R.) set by the government for vitamin C is 30 mgs. per day. Yet, few people are aware that this need skyrockets if: 1) one smokes, as this destroys 25 to 30 mgs. per cigarette, 2) one is taking medication of any sort, even aspirin or 3) he is engaged in any strenuous activity.

"Perhaps I do need something extra in my diet, but I don't want to become a health freak," you are most likely saying at this point. Well, a definition of a health freak may be hard to come up with today. If it

means giving up meat, booze, and an occasional night of excess, then who would want to be one? But if it means providing the body with all the nutrients it needs to run at its highest efficiency and to perform at its best under the stress of heavy competition, then all bike riders should be health food freaks.

Being health conscious does not mean that you have to live on yogurt and carrots. It means, first of all, that you have to take a bit of time to understand the working of the human machine. In talking to many riders, we find that they take far better care of their racing equipment than they do their own bodies. Rather silly when you stop to think about it. None would run a race on an ill-prepared bike, but 90 percent go through the entire course without adequately supplying their systems with nutrients. Likewise, few would put cheap fuel in their tanks, but the majority pay little attention to the type of fuel they throw in their stomachs. Make sense? Not to us it doesn't.

Nutrition is a science in itself, and no pretense is being made in this

short section to present all that is pertinent to the competitive rider. This is a priority list of nutrients vital to the athlete. From this starting point it is recommended that you read more on the subject as your interest dictates. This short course will give you sufficient information so that you can begin supplying your number one machine with the nutrients it needs.

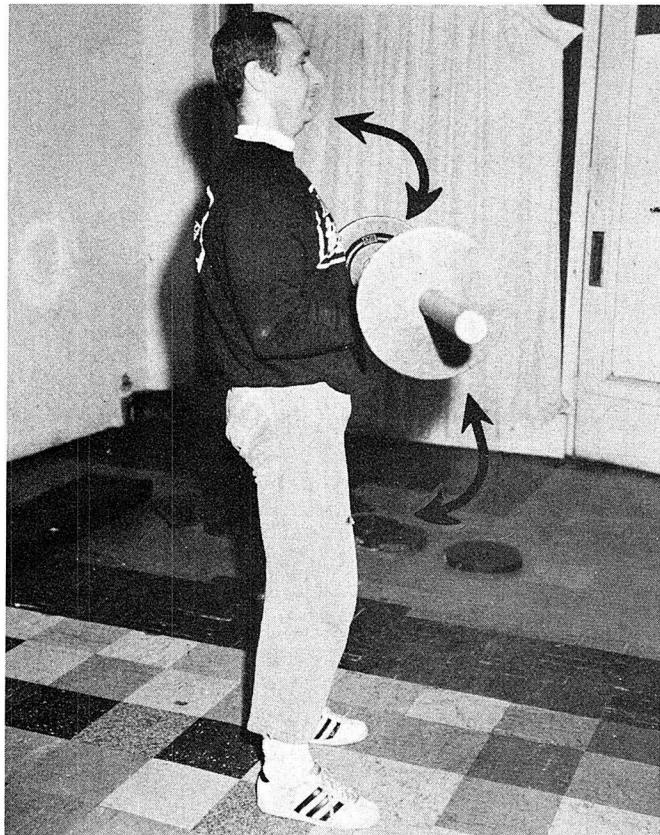
PROTEIN

Protein, simply stated, is the building block of life. You need protein every day to supply your body's needs and, the more stress you put your body under, the more protein you need. All protein is not the same. Some is not complete, since protein is made up of 22 amino acids. Of these, it is necessary to take in eight by way of your diet. If you secure the eight complete protein elements, then your body can manufacture the other 16. Ideally, you should be able to get all you need from the table, but if you place your body in physical stress then you make this difficult, as your needs go way up. According to the experts — and they

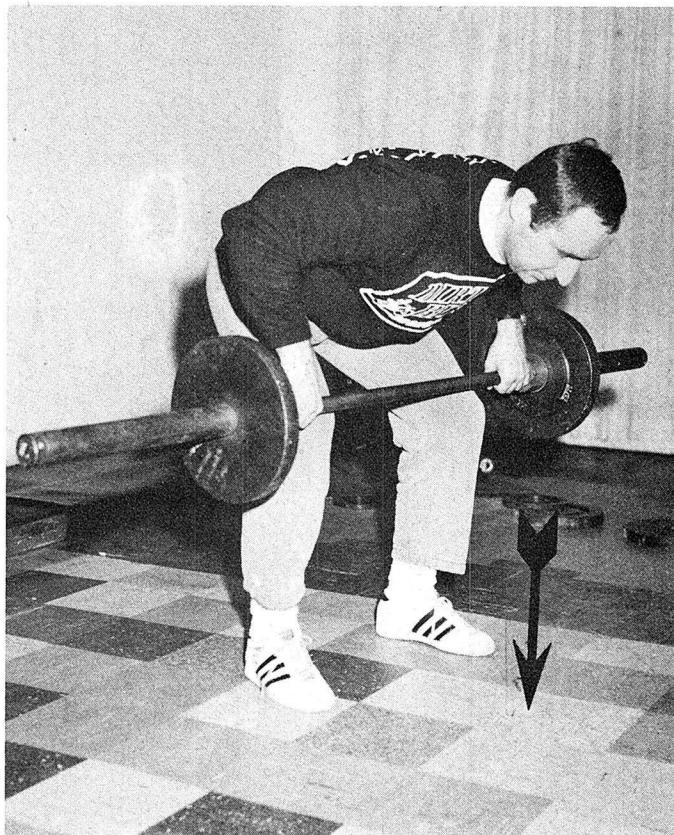
HOW TO GET IN SHAPE FOR RACING

vary somewhat — you need a gram of protein for every $2\frac{1}{2}$ pounds of body weight, per day. But this is too low for an athlete. The European athletes double this figure, so, for example, if you weigh 200 pounds, you should be getting 160 grams of protein per day. Figures like this may be confusing at first, but once you use them for a week or two and learn a bit about nutrition, then it is not really complicated. Milk, for instance, contains about 1 gram of complete protein per ounce. Drink a quart of milk and you get 32 grams of protein. Include milk with each meal and you insure yourself of getting complete protein, even if the other foods you ate had only incomplete protein. Other items high in protein are: cottage cheese, cheeses of all types, yogurt and other milk products, eggs, all kinds of meats, nuts, and beans. Lean meat is especially high. A good medium-size steak will yield about 48-60 grams of protein, depending, of course, on how much fat is included.

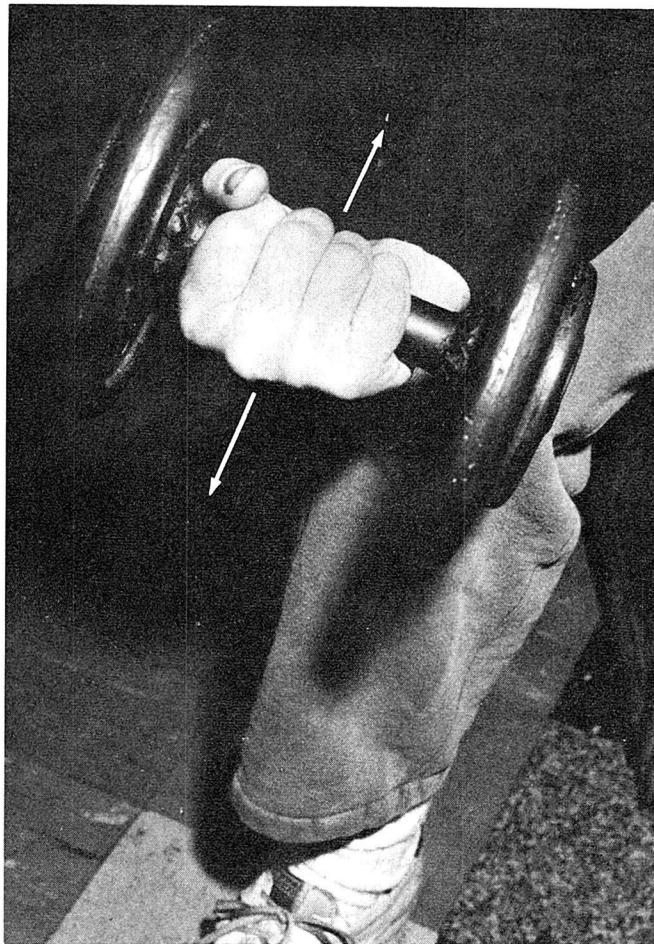
Counting grams of protein can be a bore, however, even to the health minded. The simplest solution to ob-



BARBELL CURL. Use a comfortable weight with a shoulder width grip, palms up. Slowly raise and lower the bar, keeping elbows tucked in at side.



BENT OVER ROWING. Bend over, keeping back flat. Use a light bar with a wide grip and raise bar to chest, then lower to floor. Repeat until beat.



WRIST CURLS. Assume a seated position and place the forearm on knee. Slowly curl a light dumbbell toward the body, then lower fully. Repeat.



BROOMSTICK ROLLER. Attach a light weight to a broomstick handle (via rope or cord) and roll it up and down, keeping the arms straight out.

taining sufficient protein, and all the needed nutrients for that matter, is to take a supplement. Most athletes figure that they take in 100-125 grams per day from their regular diet. They then take another 50-75 in the form of protein tablets or powder. A high-protein supplement once or twice a day mixed in a blender with fruit and milk is not only pleasant, but extremely beneficial, and it's an easy habit to get into. Who doesn't enjoy a milkshake? The protein powder actually adds to the flavor rather than detracts from it. Ten years ago, all health foods tasted like they were put together by a sadist, but today there are very good tasting products that are high in nutritional value. The protein powder of old had to be mixed with an outboard motor, but today's products can be mixed with a spoon in milk as simply as saying "Ake." The tablets can be carried anywhere and munched on all day. Most contain $\frac{1}{2}$ -gram per tablet, so if you consume 50 per day you are

adding quite a bit to your nutritional needs.

One final note before we leave protein. It has to be taken daily, since your body does not store protein. You use what you need for that day and pass the excess off. This means two things which are important to the athlete: He cannot take too much, and he can come up short if this is not a part of his daily routine.

VITAMINS AND MINERALS

Vitamins and minerals are necessary for the repair and maintenance of the body, and the more work you do the more you need vitamins and minerals. Our grandfathers really didn't need to concern themselves about obtaining these in the drug or health food store, as they could get them off the table. They had homemade bread with wheat flour ground at the local mill, vegetables raised in their own gardens that had not been sprayed with chemicals, and

meat that had not been tampered with.

Today, our vegetables are artificially ripened, our fruit is colored and shipped before maturity, and our meat is shot full of preservatives and hormones. Our bodies need all the vitamins and minerals for a wide variety of reasons. Some help to utilize protein, fats, and carbohydrates. Some repair muscle damage, prevent bruises, and build nerve tissue. Some keep the bones strong and the skin healthy. Without them our bodies are left open to fatigue and frequent injury and illness. Vitamin C is becoming a household word, due to Doctor Linus Pauling's book on the subject and, hopefully, the other important vitamins will become just as important in the coming years.

The athlete needs much more vitamin C than the 30 mgs. suggested by the federal government. Foreign motocrossers take up to 6,000 mgs. per day. This is a far cry from 30. Vitamin C, like protein, cannot be stored; you need it daily. If you

come up short today and put your body under physical stress, then you are already in deficit and may suffer for it. Vitamin C seems to prevent fatigue, it helps heal minor injuries, and prevents respiratory ailments. When you are riding frequently, take at least 1,000-2,000 mgs. per day. Remember, that everybody is somewhat different. Your buddy may get by nicely on 50 mgs. per day, but you may need 3,000 mgs. for your system.

The B vitamins work in conjunction with so many of the other nutrients that they should also be included in your dietary schedule. Vitamin B₆ helps to utilize the protein you are eating, so include a good B complex in your program. Vitamins A, D, and E are also necessary as well as the minerals. Since it would become extremely involved to explain why you need each, and what dosage is recommended, here is a brief listing of the necessary vitamins and minerals with the dosage. As you go to purchase your supplements, check the label against this list to see that the product you purchase meets these standards.

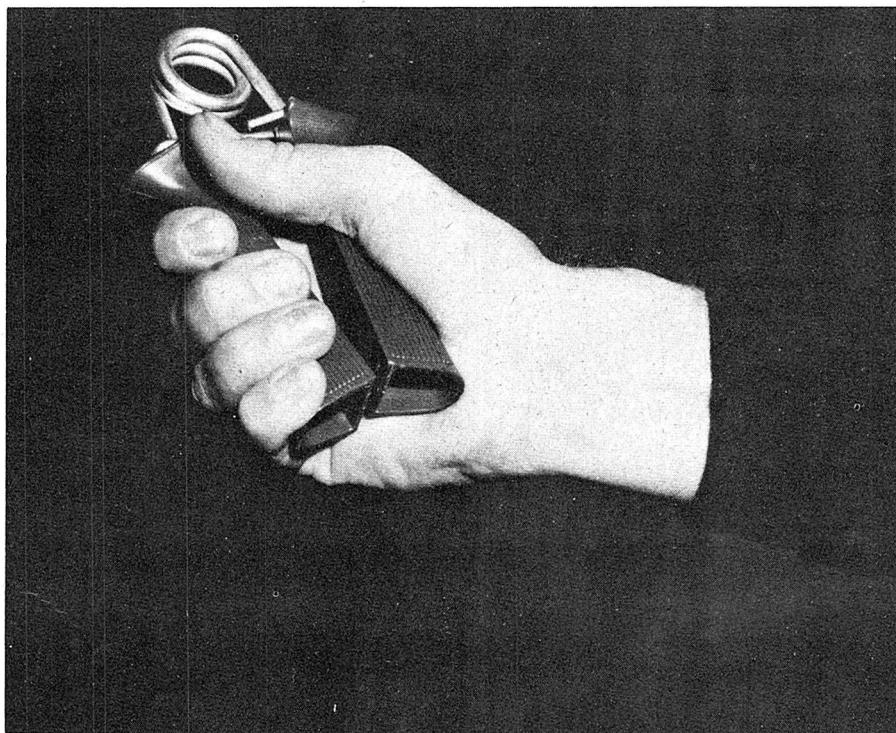
Vitamin C, 250-500 mgs. per tablet
Vitamin E, minimum of 100 I.U.

and up to 400 I.U.

Vitamin A, 25,000 USP units
Vitamin D, 500 USP units



PAPER SQUEEZE. This is tougher than it sounds. Place a full sheet of newspaper flat on the table and crunch it into a small ball. Try it with the Sunday papers for a tough hand workout, one sheet at a time.



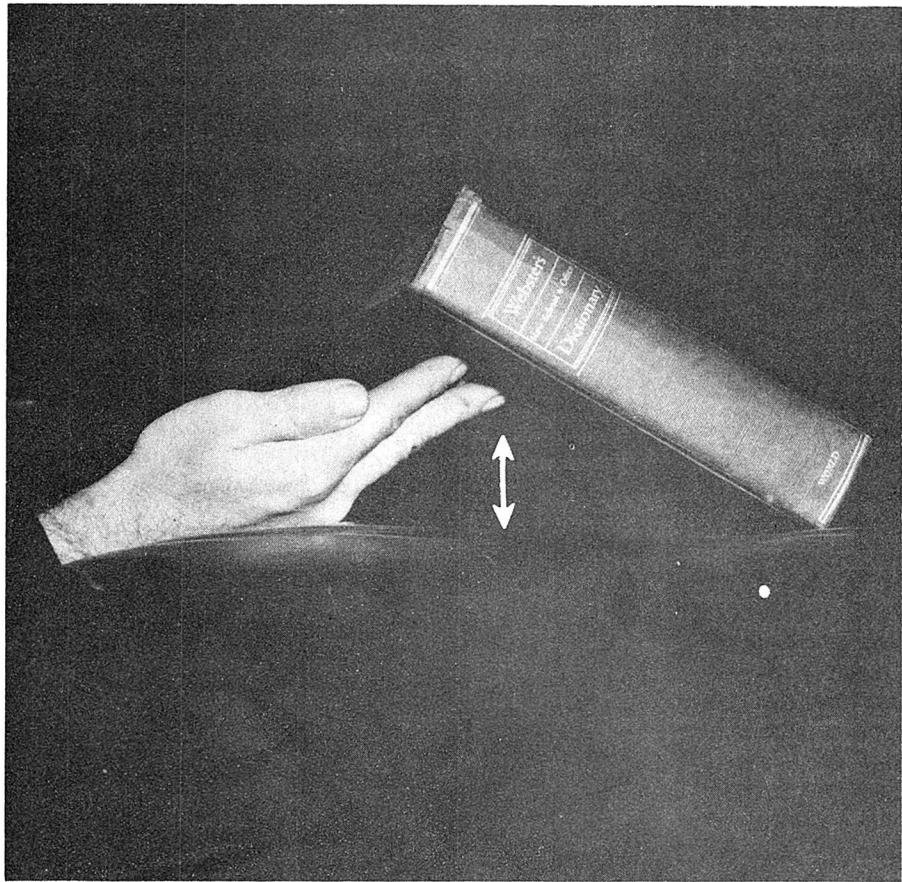
HAND GRIPPER. You can do this while driving to work. Grippers cost about a buck or squeeze a large rubber ball for the same results.

B-Complex tablet should contain:
B₁ (thiamine hydrochloride) 10 mg.

B₂ (Riboflavin) 15 mg.
B₆ (Pyrodoxine) 10 mg.
Niacinamide 100 mg.
Pantothenic acid 30 mg.
Choline 100 mg.
Inositol 30 mg.
Biotin 25 mcg.
B₁₂ (cobalamin) 25 mcg.

The mineral tablet should include:
calcium 400 mg.
iron 10 mg.
copper .5 mg.
iodine .15 mg.
magnesium 250 mg.
manganese 5 mg.
potassium 25 mg.
zinc .5 mg.

So many of these vitamins and minerals work in conjunction with each other that it is virtually impossible to separate one from another when speaking of their value. Such things as manganese may seem absurd, but it has a vital role to play in your body's functioning. It triggers a whole set of responses, espe-



FINGER BOOK LIFT. Lay a heavy book flat on your hand and raise it as high as possible with finger pressure only. Really works fingers and wrist.

cially in the nervous system, that can make a huge difference in your health. This list will enable you to check the labels at your nearest nutritional store or from a nutritional publication. Be certain that you are getting what you pay for, since name brands cost more but generally contain no more than the less-advertised items.

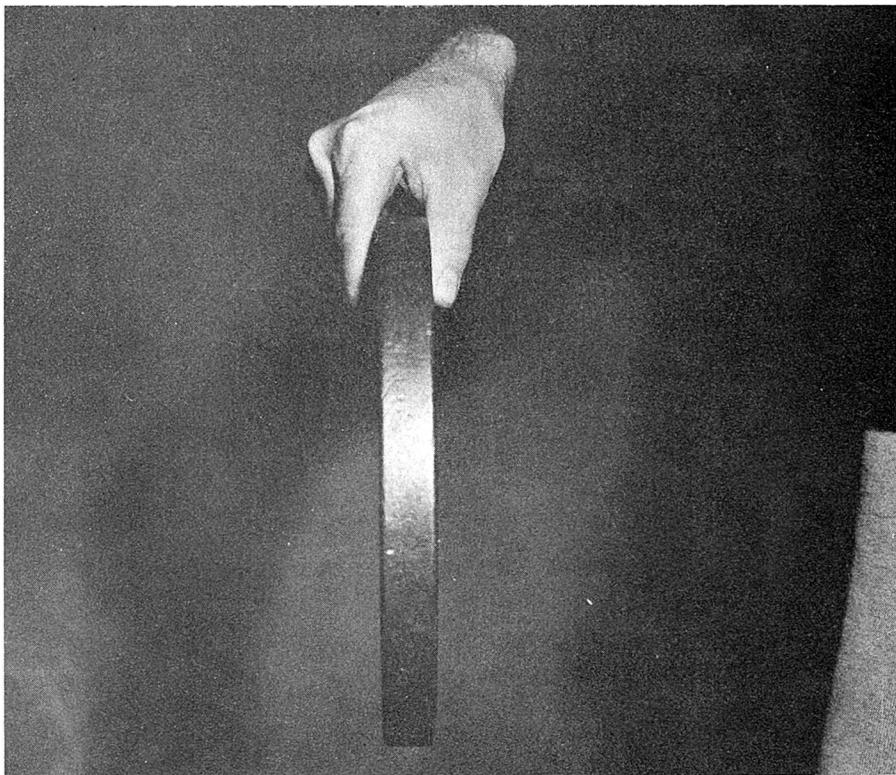
FATS

Most of the current literature has spoken out against fats, but there is more to the story than generally gets to the public. Your body needs some fat each day. The need is especially high for polyunsaturated fat, the kind found in vegetable and seed oils. Fats, like all the other necessary nutrients, work in conjunction with vitamins, minerals, proteins, and carbohydrates in our bodies. Should you neglect one of the necessary items, then all the others get thrown out of balance. Just be sure to include some polyunsaturated fats in your diet daily and avoid as many unsaturated fats as possible. Which is which? The polyunsaturated fats include: safflower oil, corn oil, pea-

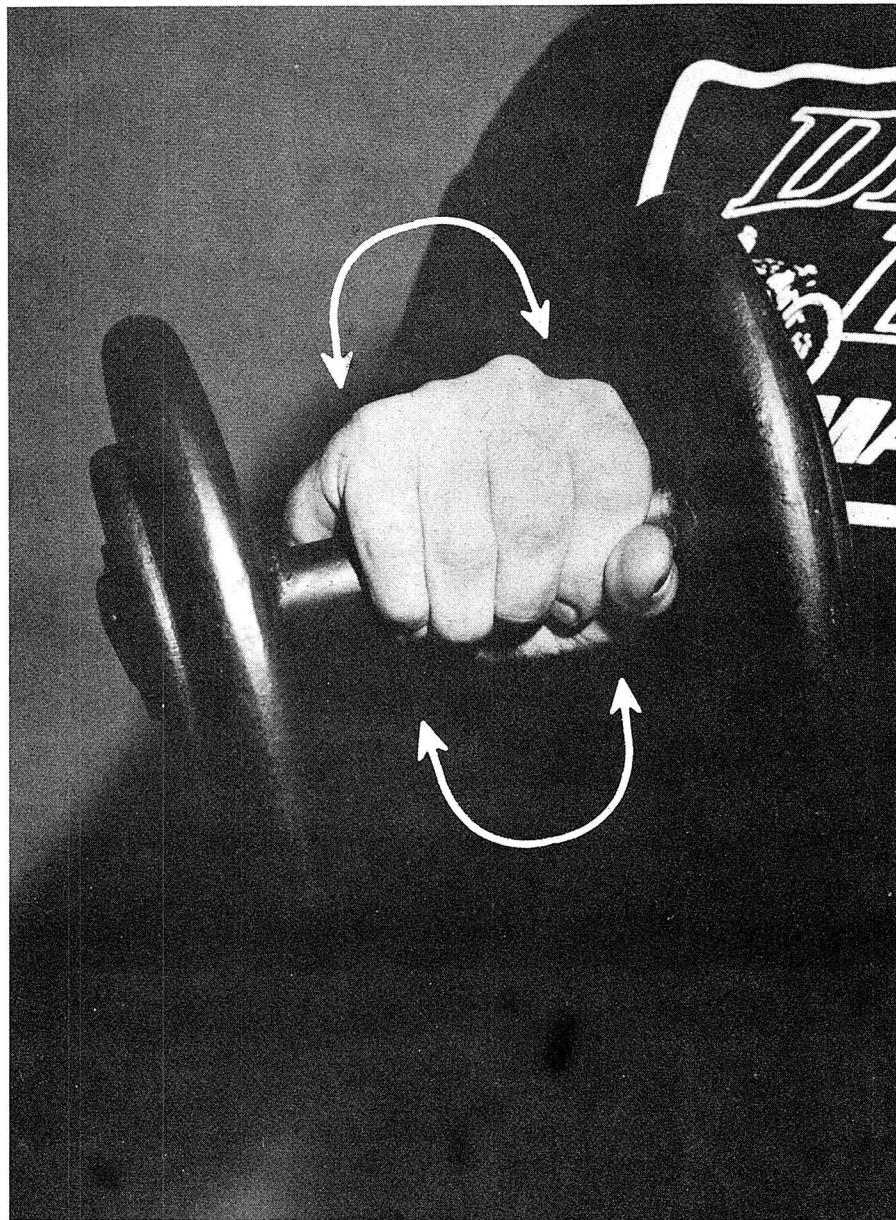
nut oil, linseed oil, and all the other oils from vegetables and seeds. The unsaturated oils include butter, lard, margarine, and other forms of animal fat.

Getting bogged down in nutritional facts? No need to. Here's a rather simple, complete plan to follow to insure that you get all the necessary nutrients for your personal needs.

1) A protein supplement in addition to your regular diet which should include plenty of dairy products and lean meats. The higher percentage of protein in the supplement the better, but avoid buying one which is primarily made of soy bean. This is the cheapest grade of protein and is not easily assimilated by the human body. A good protein supplement you can make yourself is a milkshake made of: dried milk solids (27 grams per cup), a cup of flavored yogurt (don't get the unflavored by mistake—8 grams of protein), some ice cream (for taste rather than for nutrition), a piece of fruit (anywhere from 2 to 6 grams depending on the fruit) and a quart of milk (another 32 grams). This gives you a total of 70 grams of additional protein per day, and it's a delightful and inexpensive way of obtaining extra protein.



PINCH GRIP LIFT. Lift a barbell plate or heavy object with a pinch grip and hold as long as possible. Don't drop it.



ZOTTMAN CURL. Same motion as a barbell curl, except that a light dumbbell is used and the weight is rotated as it is raised and lowered.

2) A good vitamin-mineral supplement. Check the labels against the outline given earlier in this article. Avoid name brands if at all possible as you will end up paying for their national advertising program. Vitamin E is vitamin E regardless of whether it's put out by Rexall or some independent vitamin company. Most vitamins are manufactured by a small number of companies, and all the other companies, Rexall included, merely place their label on the product. A little reading will save a dollar or two.

3) Vitamin C should be taken as a separate tablet, as it is nearly impossible to get enough C from the multiple vitamin-mineral tablets.

Most contain anywhere from 30 to 100 mgs. at the most. This is not sufficient for your needs, so purchase your C separately. It is recommended that you obtain the higher mg. C so that you will not have to be taking so many. They come in 250s and 500s.

4) The B-complex vitamins. Sometimes these are included in your multiple vitamin-mineral tablet. If they are, fine. If not, purchase a separate item that contains what you need. At this point, you may be saying that this looks like an expensive endeavor. Not really. You can supply your body with all it needs in the way of nutrients and spend no more than \$15 to \$20 per month. That's

HOW TO GET IN SHAPE FOR RACING
really not much to spend on one's health, no matter how tight you may be, or how much you have to spend to keep your scooter going.

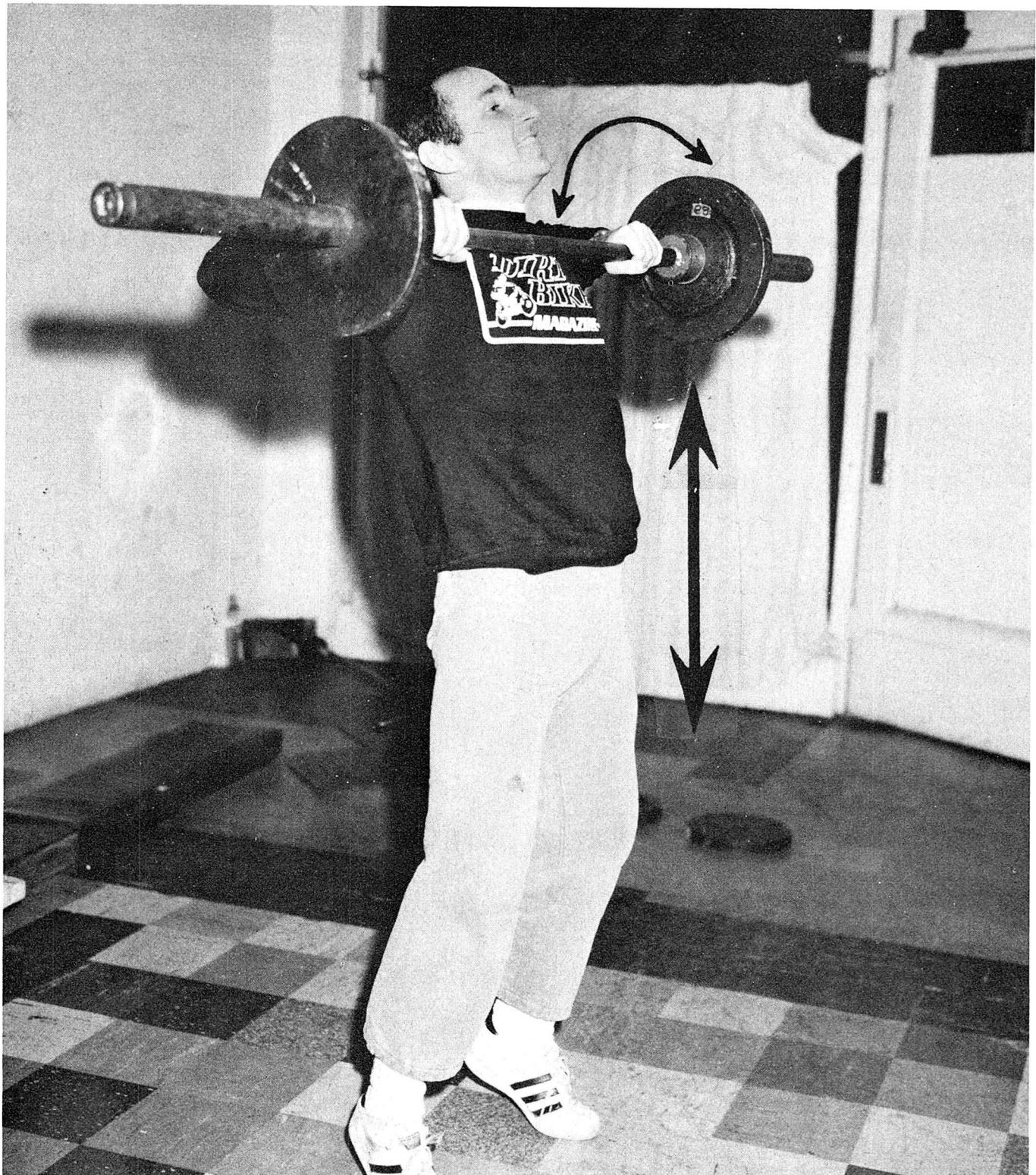
5) Unsaturated fats. If you use corn or safflower oil in your salads or cooking, you have this covered pretty well. These do come in the form of capsules and you may want to use them, but most obtain what they need in their diet if they pay attention at all. Just have the wife start using safflower oil instead of Crisco, Spry, or the other hard fats.

This takes care of the basics, but if you want some excellent extras, here are a few suggestions that athletes have found to be worthwhile.

Liver tablets. Liver is one of the most complete nutritional foods available. Liver tablets are an excellent way of obtaining protein, B-vitamins, and minerals. Most contain $\frac{1}{2}$ -gram of protein each. Fifty taken during the day with a glass of milk will just about insure that you get all your needs in this area.

Wheat Germ. Wheat germ oil is a terrific supplement for athletes, because it contains so many of the vital nutrients. It comes in three basic forms: liquid, capsules, and cereal. The liquid is the best and least expensive per volume, but for those that cannot handle the liquid then the capsules are next best. Get no less than the 20 minimum capsules, as the smaller sizes are a waste of money. The cereal is also good and can be included on everything from soup, to salads, to meat. It's high in vitamins, minerals, and unsaturated fats, and a tremendous source that many racers use before and during competition. It has been proven that wheat germ oil added to the diet of athletes increases endurance, and this has to be of value to the competitive biker.

So much for the day-to-day program of nutrition. It does take a week to 10 days before the nutritional program can be felt, so don't be impatient. Give your chemistry time to adjust to the new resources before giving it up. Once you get on a sound nutritional program, you will never give it up. There's no describing the feeling you have when the supplements start doing their job. Long after your competitive bike riding days are over you will benefit from knowledge gained from practicing a sound nutritional program.



POWER CLEANS. Pull a light bar smoothly from the floor in one motion to the shoulders. Repeat until exhausted. This one even toughens hands.

FUEL FOR THE RACE ITSELF

So you get your body in order, nutritionally, for the big race. How do you go about feeding it on race day.

The proper foods to eat before a race would be high carbohydrate foods: fruits, vegetables, spaghetti,

potatoes, bread, ice cream, rice, and so forth. Carbohydrates, and fats for that matter, serve as a quicker energy source, and this is what is needed out on the track. Carbohydrates and fats break down into twice the energy that protein foods do and in much less time. A compe-

titor should have his last meal no closer than two hours before a race to give the food sufficient time to break down so as to be an energy supply. Any closer only results in sluggishness because the digestive process is competing with the muscular system for blood. If you have

occasion to take in any foods during the race, they should be very quick-acting energy foods. Honey is excellent since it is basically fructose (fruit sugar), and breaks down in the system faster than dextrose or table sugar. Fructose bypasses one of the digestive processes and this is why it gets to the blood stream faster. Orange and other fruit juices are also good energy foods just before or during the race, as they are high in carbohydrates and also contain fructose. Fructose, in the form of tablets, is also available, and these are most valuable as you can chew them as you ride and keep your blood sugar high.

Another valuable supplement to consider during the race, especially

if you are prone to cramping, is a Gatorade-type drink. These drinks come in a variety of names: Sportade, Quickick, Half-time drink and are made of, quite simply, the valuable minerals that you lose when you sweat. Sodium, potassium, and calcium are the standard ingredients and you will find that you can prevent much after-race tiredness and fatigue if you keep a jar or two of this handy.

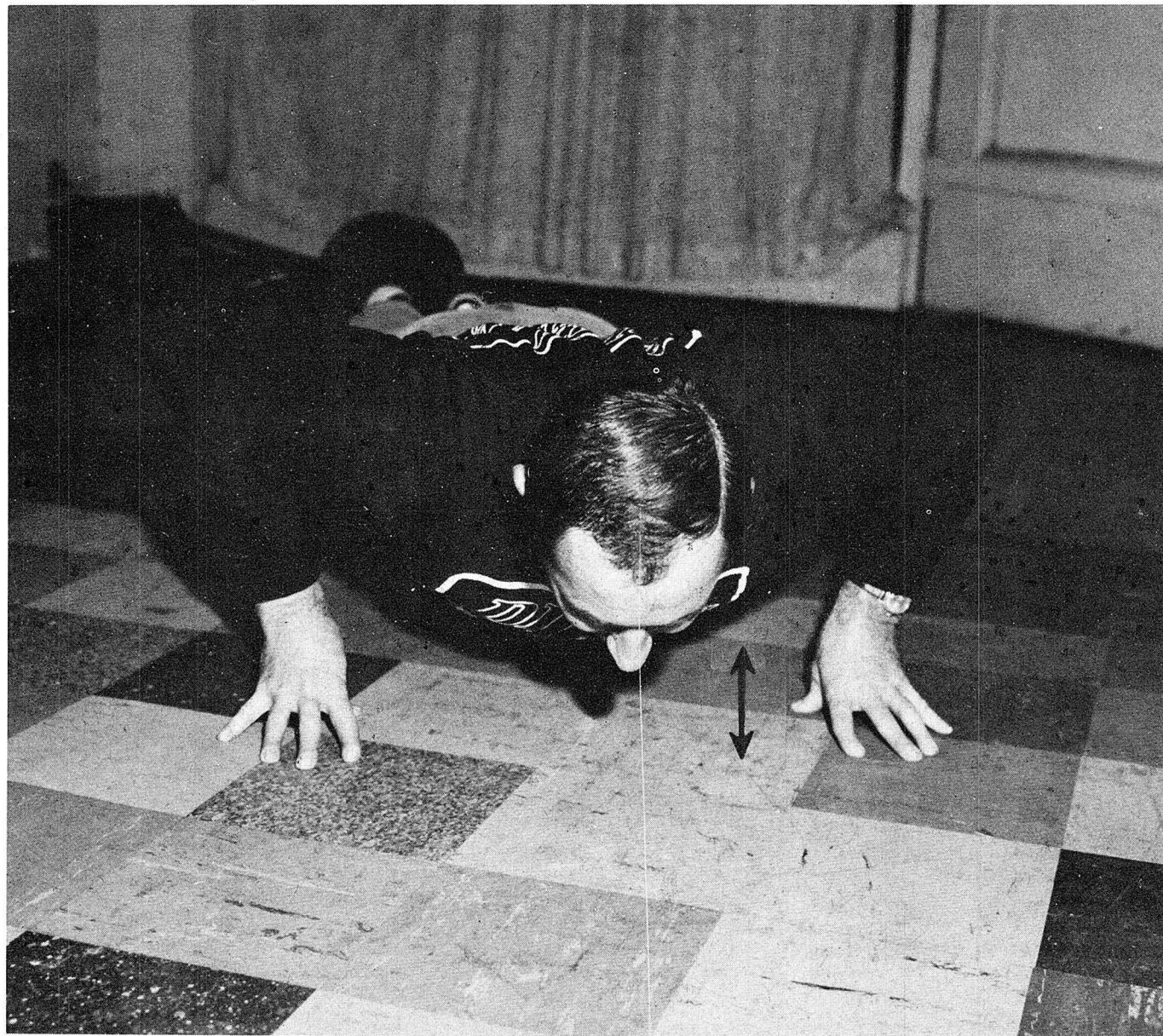
After the race is when you need protein, so go treat yourself to a big steak, win or lose. One final item picked up from the Europeans: The sooner you take protein into your system after competition the sooner your body will recover. The longer the body stays in a state of need,

FINGER TIP PUSH UPS. Tough one. Same as a normal push up, except that it is done on extended finger tips.

HOW TO GET IN SHAPE FOR RACING
the longer it takes it to resupply those tissues and that time lapse generally means fatigue. Some athletes carry a thermos of a high-protein drink and suck it down immediately after the race.

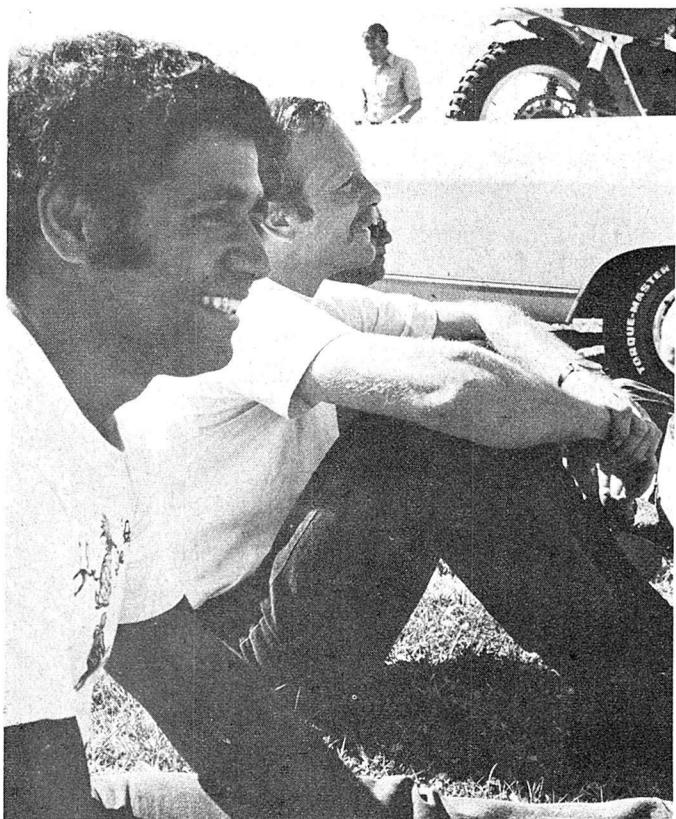
You see, you don't have to be a health nut to know something about nutrition. Application of the ideas set forth in this article will give you a definite edge on your competitor next time around. There's an abundance of evidence to show that overall performance is increased measurably when a sound nutritional program is followed in bike racing.

It's a wise racer who takes care of his machine, and the human machine should have top priority on the racer's checklist.



MENTAL PREPARATION

THROUGH PROPER PRACTICE



You won't find top racers like De Soto and Thorwaldson all uptight right before a race. Two hours before the Mint 400 got underway, these two were laughing and relaxed. But right before the flag dropped, they were all business.

There is not a man among you who has not had the dread "butterflies." You may call them by a different name, but the symptoms are the same, no matter what part of the country you hail from.

They're characterized by an incredibly queasy feeling deep in the pit of your stomach — accompanied by a rattling movement of your large and small intestines.

You feel nervous, flighty, tense, giddy and clumsy — all at the same time. And you have to go to the bathroom — even if you were there five minutes ago. It never fails.

This condition is normal for all racers.

They say when that feeling goes away, then you're ready to quit racing. We all learn to live with that feeling to some extent. But picture the rider on the line who is caught up with the butterflies and is also totally insecure and dreading the fall of the flag. Most riders, once the flag drops, leave the butterflies behind on that starting line. The poor bastard who is not mentally prepared, carries them with him through every turn and they coil around his throat every time the bike leaves the ground for a jump.

This man is not only racing against everyone else on the track, he's also racing against himself. No one ever won a race without the proper mental attitude.

How can one achieve the proper mental state? The answer lies in a very old, slightly corny, but all-too-true saying: "Success breeds success — Failure breeds failure."

The rider who is doing things properly and winning, or placing high, does not doubt his ability. It is the rider who can barely unload his bike from the loading ramp without crashing that is plagued with self-doubt. And rightfully so.

Your mental attitude, then, is directly tied in to how you are physically performing. Most of their lack of confidence stems from the way practice goes.

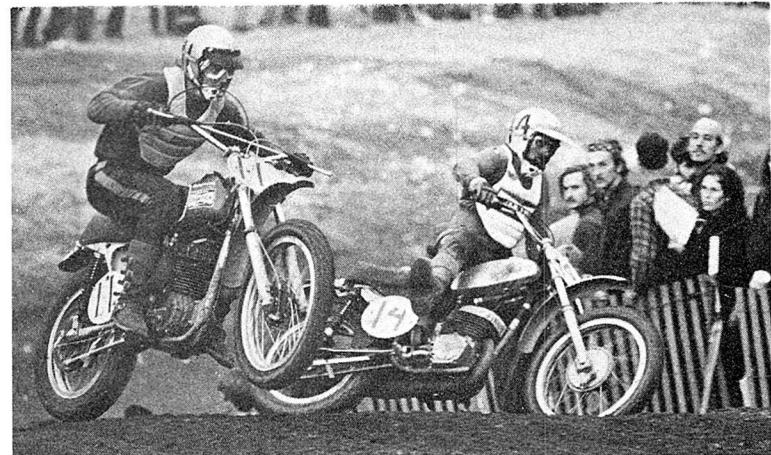
For this type of rider, practice consists of doing only what he does well and avoiding his weak points. If he's great on left-handers, and weak on right-handers, chances are he'll spend all day going like hell on his favorite turns and creeping on the rest.

In his mind, he admits his shortcomings and avoids confronting them. Yet, in the back of his mind, he knows that in the race next Sunday, he will dread those right-handers and it will affect his performance on those well practiced left-handers, too.

What this rider must do is modify his entire approach to practice, and totally commit himself to working on the weak points. At first, this is totally frustrating and takes all the fun out of riding.

One more saying applies to the correct approach to solving the problem: "If you can't do great things, then do small things in a great way." Translated, this means that you must take that weak point (or points) and find

The difference between making a corner and crashing is largely a matter of rider confidence—which can only be built through practicing successfully.



some part of it that you can do at least decently. This might be a very slight right-hander that you can negotiate decently. Take this one turn and work at it. Ignore everything else. Get so damn good at this one turn that you find it almost beneath you. Then find one like it, only slightly more difficult.

Apply everything you learned on the other turn to the new one — and work. Work until you get past the point of even wanting to ride any longer. Get it to the point where it can be approached with a nonchalance that is near casualness.

The mechanics are very simple. Let's say the right-hand turn we are talking about is a natural, 40-mile-an-hour thing. You have never been able to take it at more than 30 mph.

Take the turn at a very comfortable speed (say 25 mph) until it becomes ludicrously simple.

This will happen sooner than you think. Keep some restraint on that throttle hand. Don't speed up just yet. Remember, we're trying to breed success, not failure. Do it, do it some more, then even more, until you are damn near eager enough to crash, just to break the boring routine.

Then, very gently increase the speed. Not much, not enough to even hint at a crash. And corner some more at this speed. Again, until you are thoroughly bored.

Once again, a slight increase in speed. And repeat the pattern again. And again. And again. Each time, increasing the speed slightly.

If by chance you should crash while on the way up in the speed ranges, drop down to the original 25 mile per bit again. You will be so relieved to get away from that scene that the possibility of a crash does not daunt you in the least.

You will soon find yourself going through the corner much faster than you ever had in the past. And much more importantly, you have done a small thing well.

And, really, when you get down to the business of racing, isn't it nothing more than a series of small things done well?

Your whole attitude, then, should be that of taking each and every fear and shortcoming one step at a time.

Look at the turn, or the jump, or the uphill and break it down in small sections. Surely, a small section of that feared thing can be overcome. Concentrate on that one small section, master it, then move on to the next.

When all the sections have individually worked over, put them all together, one additional step at a time, and there you are.

Example: We have a short straight, a turn with a high berm on it, and another short straight exiting it.

You know you should be blasting into that corner high up on the berm, but you just cannot commit yourself to flinging the machine up there at a high rate of speed. Yet, you know that is the correct line, because everyone and their mother passes you up there and all the winning experts are using it.

Break it down. At first, just concentrate on going in as deep to the corner as you can before braking. Don't even bother about completing the turn. Go deeper and deeper, braking harder and harder in order to slow the bike down. All you should be concerned with is how deep you can go in this corner before you can stop the bike. A few of the times, you may overcook it so much that the bike will stop up on the berm. Fine, no problem.

Now, take your attention to the exit of the turn. Roll gently into the corner, again disregarding the berm. Then, when the machine is set up, accelerate as hard as humanly possible. Concentrate, then, on accelerating earlier and earlier and earlier. You'll soon find that you have reached an arbitrary limit that you can use on the level, and are looking at the berm wistfully. Again, fine. Start using just a little of the berm to get a better line at exiting the corner under power. Add a little more, and a little more. Soon, it'll be necessary to go quite high on the berm to get the drive you want out of the corner.

This is when you back up and work on a few more of the brake approaches. Then let a few gentle complete turns roll loose. You'll be so smooth that you'll astound yourself.

Again, gradually increase the speed, using the braking successes and the exiting successes that you've mastered. The berm then becomes a pivoting point for you to use as a transition for your newly mastered skills. You have just conquered a corner. And probably without a single fall or crash.

This technique can be applied to whatever ails your riding skills. Remember, don't just screw around and feel sorry for yourself — do something about it. But do it in a way that builds confidence.

The next time you're on that starting line, you'll be eager to get out there and dazzle somebody on your *new* favorite corner. The rest of the answer is simple. Make every corner, no matter what kind, your favorite. But do it at your own pace and consider it a small thing that you can do well. Then leave those butterflies where they belong — on the starting line.

PLANNING THE RACE- FROM THE GARAGE TO THE STARTING LINE

A wise man once said, "He who does not plan his race is sure to finish in last place."

We won't say who this wise man is; but, we do know that he obtained his smarts the hard way. He went to race a couple of hundred miles from his home. Upon arriving at the track, he found out that the track was located at an altitude more than 3,000 feet higher than home, and all his carburetor jets were tucked away comfortably in his garage. In his haste to get going, he forgot to pre-enter and had to pay an inflated entry fee. He also forgot some necessary tools and spare parts, as well as drinking water.

This gentleman came to the race so ill-equipped that his mind was tweaked by all the hassles, and his performance on the course reflected his anger. Lots of crashing . . . and last place.

Success at bike racing is contingent on so many different factors that it is necessary to plan what you're going to do ahead of time. Here are some hints.

EQUIPMENT

Always take as many tools with you to a race as you can comfortably carry. If your space is limited, determine which tools are most likely to be used. Needless to say, there is no reason to take a Buick wheel puller to the track, just because it happens to be in your tool box. The following list is a good basic assortment of tools for the bike racer: open end/box combination wrenches for every nut and bolt on your bike; a selected group of sockets for jobs that require them because of location or time; vise-grips and water pump pliers; a big screwdriver that can double as a pry bar, a medium- and small-size driver and Phillips if necessary; tire pump; a hammer; spoke wrench; flywheel puller; needle-nose pliers; tire tools; chain breaker; feeler gauge; and dial indicator or Micro-Time. A torque wrench will come in handy if you have to pull the head, and an impact screwdriver will save a lot of swearing on those frozen screws. All the tools mentioned above will fit in a reasonably small box.

What spare parts you wish to take is dictated by the

type of machine you ride and what breaks a lot on it. Here are some items that are pretty basic: spare cables (remember, a minor spill can ruin a cable), plugs of various heat ranges, pilot jets, needle jets, main jets, nuts and bolts, and chain repair kit. Spoke nipples often come in handy, and if you really want to get trick, extra tires for different types of track surfaces. Duct tape, baling wire, and rubber bands for CZ and Maico riders are a must. Better toss in a tube patching kit and spare inner tube, also.

Put all your riding gear (helmet, leathers, etc.) in a duffel bag or a similar conveyance to keep it all together for easy transportation and quick inventory. An extra racing jersey is a good idea. Smart guys take along a jacket for early morning practice and sudden weather changes. Carry a brightly-colored hat along to keep wind gusts from turning your hair into a fright wig, or to prevent sunburn if you're bald.

The personal comfort items that you take to races are determined by your own preferences. Make sure that you take something to drink and eat, if so inclined.

GETTING THERE

A good way to foul up a Sunday is to wake up in the morning and think, "Far out, it's Sunday. Let's see now, where am I gonna race today?"

If you find a race that you want to enter, send in the entry as soon as possible. Post entry usually costs a couple of bucks more and makes the hassle-potential skyrocket.

After you decide what race you are going to enter, figure out how far away the track is, so that you can leave at the right time in the morning to get there for practice. The best plan is to find out *exactly* where the facility is, so that you don't have to blow practice driving around looking for a track you haven't been to before.

Walk the course before the race and examine every turn, especially the first one. Know where you want to go before the flag drops.





The pre-race walk through can enable you to spot dangerous spots that you can avoid during the race. Find out where they are before you ride over them.

The night before the race takes some planning also. You will find it best to load up all your gear and bike the night before the race. This is not possible for some of us who live in an area where thieves run wild at night. If you can't load up the night before, at least get all your stuff together in one big pile in the garage.

After a nice, healthy, non-greasy dinner (the food you eat will be in your stomach during the race . . . do you like to race with a wad of yesterday's burritos in the old tubes?), select the bad habit of your choice for the rest of the evening. Providing, of course, that it is not a gallon of wine or any other alcoholic beverage. Other things may be OK, but who are we to say if the finest medical authorities in the country haven't figured it out yet?

If you have followed our suggestions up to this point, you will be at the track, entered, your tools and spares all clean and shiny in the truck, and your machine ready to go.

You will notice that nothing has been mentioned about machine preparation; Not how to do it, just to *do* it. The reason is that we assume that you have enough sense to make sure that the bike is ready to roll. (If

you don't have enough sense, read the chapter on machine preparation.)

Now what? Practice. Contrary to popular belief, practice is not an impromptu race. You are supposed to practice riding the track fast, not practice racing. The temptation is there, but you should be out there picking your lines through the corners, and making a note of the good and bad stuff.

PLAN THE RACE

Walk the track if you have the time. That way, you can check out all the obstacles up close. You will see the best way to get around the track better on foot than you will on a bike. Picking a line is a lot like picking your nose; in order to be successful, everyone has to do it . . . but while they're doing it they pretend to be doing something else.

The object to picking your path around the track before the race begins is so you don't have to do it during the race. If you wait till the first heat race to select your line, you will always select the easiest one, which usually isn't the fastest.

Both straights and corners should be examined for several points. First off, find the smoothest way through. That will be the path with the fewest ruts, bumps, and chuckholes. Next, select the fastest way through. In the case of a straightaway, the smoothest way will usually be the fastest way, but corners are a different story. Figure out the fastest route into a corner, then the quickest route through, and finally, the best exit area.

Now, between the fastest way and the smoothest way, decide on a compromise that will allow you to enter the section, conquer it, and leave it in the fastest manner—all set up for the next section. This isn't very easy, because the fast way and the smooth way are usually about 10 feet apart. Use every bit of traction that you can find, but remember that the track will change as the day wears on. What might have been

a good line early in the day, may have to be abandoned as the ruts shift around and get bigger and the berms get higher.

Here are some points to remember about selecting a line: Loose stuff aids in braking, but is lousy for acceleration, and conversely, hard surfaces are good for getting it on, but poor for getting it off. On an uphill section, the smooth path is almost always the fastest way, even if it is slightly steeper or longer, or both, than the rough line. Don't be a sucker for the berms; just because there is a berm in a corner doesn't mean that you have to use it. Quite often the inside line will be faster, and using it will allow you to pass all the hotshots spraying the spectators with berm.

NOW WHAT (AGAIN)

Get it on!

A "rush-to-the-track-last-minute-repairs" start can cause you to ride sloppy and lose concentration.



QUICK START TECHNIQUES

Jeff Smith, the ageless British motocrosser, is fond of saying there is only one point in the race you must be in first place: when crossing the finish line.

While this is undeniably true, it sure helps a lot if you don't have to fight through the pack. Riding in front of the crowd demands a quick start, preferably first into the corner.

There are almost as many different ways of starting races as there are motorcycles: in gear, hand on helmet, hand in the air, dead engine, Le Mans running start, straddling the front wheel, gate starts, trenches, rubber bands and so forth.

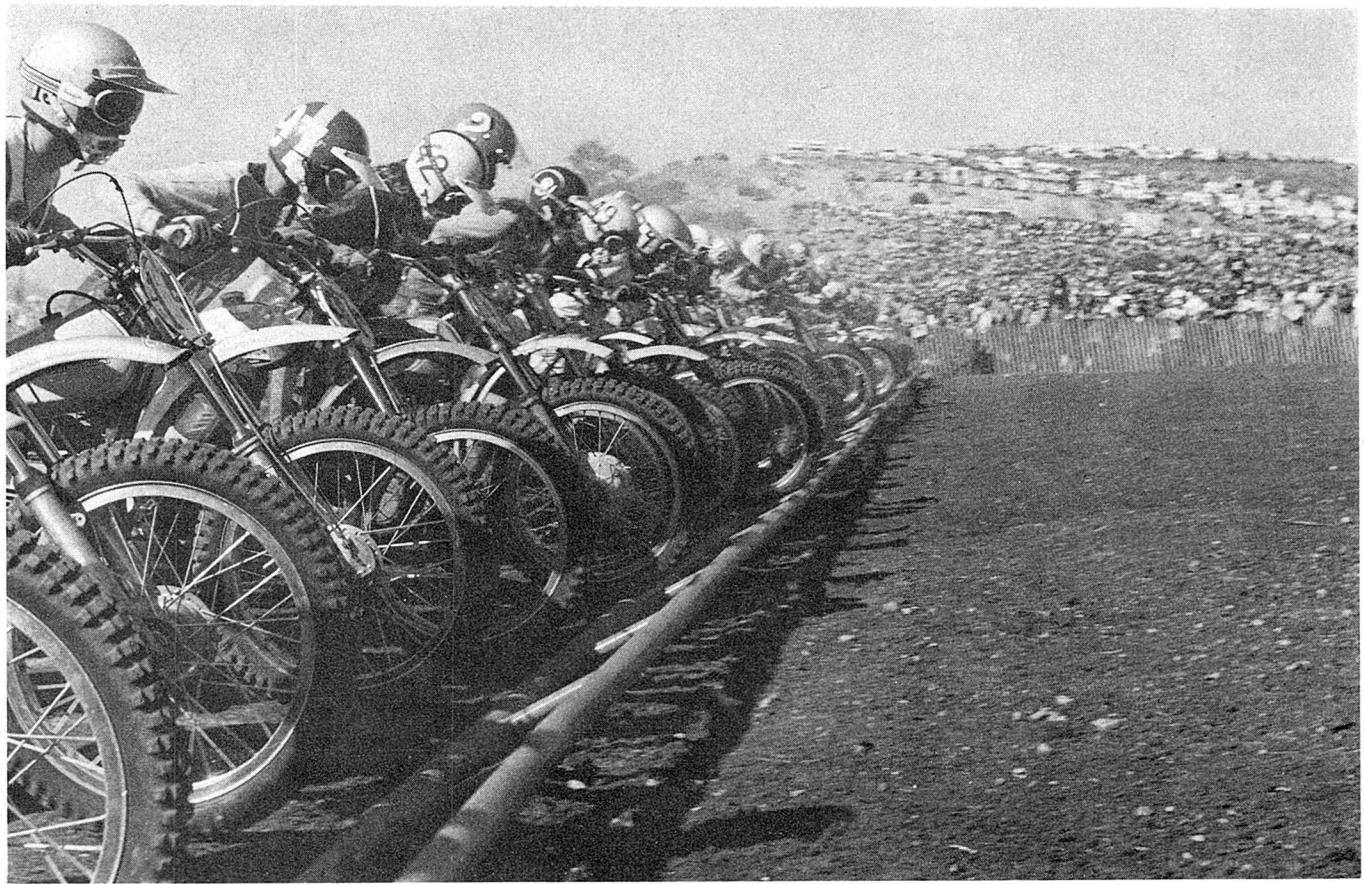
Most of these are variations on three basic ways to start:

1. Dead-engine starts. This would include Le Mans, straddling the front wheel or any type of race that demanded firing up after a given signal.

2. Live-engine starts with a flagman. Both in-gear and out-of-gear starts can be included in this category.

3. Live-engine starts with a mechanical barrier. These are more common in Europe than here, and include gates, rubber bands or any mechanism that triggers the start.

Dead-engine starts are used primarily in desert events,



The starting gate is becoming more common in motocross events, largely to prevent cheating. As long as the rider keeps his weight well forward and the power on, he will not even feel the gate as his tires pass over it.

Even if the starters were not quite ready, your action at a critical time may bewilder them, causing them to drop the banner anyway. A smart rider can almost force the starters to do so.

STRADDLE THE BIKE whenever possible, rather than kick start by standing alongside. With some practice, you can learn to kick on the left side.

One of the most fantastic starters is Whitey Martino. His Husky has a left side kick starter and a right side gear shift. His method is as follows:

Bring the piston on top and set the kick starter at the most comfortable forward position that full leverage can be applied. The bike must be kept as near vertical as possible. At the signal, rise up and slam full body weight on the kick starter. As the kick starter nears the bottom of its stroke, jam the bike into low gear without using the clutch.

Ideally, the engine will fire just slightly before low gear is engaged. This takes some fancy balancing, because both feet must be lifted from the ground momentarily, but the quicker it's done, the easier it is to balance. During these gymnastics, the body weight must be kept forward and the throttle should be at least two-thirds



If you have a "wrong side" kick starter, you will be under a handicap for dead engine starts, if you persist in starting the machine while standing alongside.

Hare Scrambles, European Scrambles or any event that might have a large number of riders starting at the same time. This is a safety factor, if nothing else, and tends to separate and stretch out the competitors quickly. A half-second lag on the starting line can mean many feet lost.

The single most critical factor for a successful dead-engine start is the engine itself — it must be spot on. Timing and carburetion are critical. A properly tuned racing machine should start on the first kick, nine out of 10 times.

One mistake many riders make, especially in the desert events, is in not compensating carb jetting for altitude changes. The machine may start immediately in the garage at home, but take it up 4,000 feet higher, and it may load up, blubber and die on the starting line.

Assuming the machine will fire on the first kick, you must then devote full attention to the banner or flagman. Most events drop a banner to signal the start, generally a good-size one. Keep your eyes on the men holding the banner. Quite often, they might give themselves away by nodding slightly or talking. Watch the hands and forearms. When you see them tense, chances are that the banner will drop immediately after.

If you have an opportunity to watch the starters drop the banner for any races held before yours, do it. If you spot a mannerism (like the head nodding) two or three times in a row and it happens during your event, fire that bike up NOW!

If you've read it right, you can pull a hole shot on the field, and everybody will have to eat your dust. If worse comes to worse and the banner *doesn't* drop, you'll just get some dirty looks and have to shut it off.



With enough practice, you can learn to kick it over with the left foot. This can save you precious seconds on the starting line.



To illustrate the point, both of these riders waited for us to give the signal—both bikes had a left side kick starter.

of the way on. This will vary, of course, from bike to bike.

It took Whitey almost a year to master this method, and he rarely stalls the engine. As he says, "It's definitely worth the risk. That quick start can mean the difference between putting on an early charge and fighting the pack. I miss about once out of 15 times."

Riders with machines that can be started in gear don't have to be taken through this drill, if their clutches are properly adjusted.

On dead-engine starts where one must run to the bike, do not use the sidestand. Instead, prop up the bike

with a stick that will fall clear when the machine is mounted.

One way to help ease the actual mounting of the bike is to leave it standing as crooked (in relation to the other bikes) as the officials will let you. Take as much room as you can get. This will help in keeping other riders from jostling and bumping into you while you're trying to start.

Live-engine starts are another story. Timing becomes more critical, and the riders will be bunched much closer together. Few sights are as exciting as that of 40 riders madly charging for the first turn on a motocross course.



Both engines started on the first kick, but while the CZ rider was still swinging his leg over the saddle, the Maico rider was already in gear with the rear wheel starting to spin . . .

Before getting down to the actual mechanics of leaving the line, a good rider must consider a number of things. Where does he want to be in the first turn? How will this set him up for the second turn? It really doesn't do a rider much good to be leading in the first turn, only to find that he's so poorly set up for the second turn that he gets passed.

Study the first two turns carefully. Pick your desired line and at least two alternate lines. You can never tell when the line you want may be blocked. Plan ahead.

If you have a choice as to where you can place your machine on the starting line, try to position yourself between two slower riders. This gives you a little leeway if you don't read the starter quite right.

If by some chance you get stuck in a second-row start situation, get behind the fastest rider off the line. Sometimes, he'll punch a hole in the crowd for you, and you'll find yourself suddenly in second or third place in the first corner, despite the second-row start.

This is especially effective if the rider you place yourself behind has a reputation for being brutal and fearless off the starting line. Most riders, reluctant to tangle with a guy like that, will give him plenty of room. Take advantage of the other riders' caution.

On the start itself, you've got to learn to read the flagman, either on an in-gear start or a neutral-hand-on-helmet start.

THE HAND-ON-HELMET START lends itself to more cheating than any other kind of starting method. Riders use everything from cheater clutches to special levers welded on the clutch arm. CZ riders long ago learned to hold in the clutch actuation arm with their left heel, enabling them to leave the bike in low gear. When the flag moved, they just lifted the boot heel and smoked it off the line, usually in pretty good position.

Many riders place a compression release lever on the throttle side and run the cable jointly to the actuation lever, giving them, in effect, an extra clutch lever. While this takes some getting used to, once mastered it gives the cheating rider a tremendous advantage off the line.



If you find the inside of the first turn crowded, swing wide and try to cut in. A congested first turn can nullify a decent start. Position your bike on the line to allow an alternate approach to the first corner.

Most of the faster riders don't bother with these devices, however. Instead, at the drop of the flag, they just slam the machine in gear without using the clutch. This is tough on a gearbox; on some machines, the trans will not stand up to this kind of abuse. CZ and Montesa seem to be able to take this kind of abuse more than other machines. Both have excellent gearboxes. But don't try this trick too often on a Husky — especially the 400.

If you feel that your gearbox can stand up to being slammed in gear, learn to keep as much weight as possible off the machine. Let the rear wheel spin easily, then ease back in the saddle once the bike is moving and on the pipe.

The body weight should also be kept as far forward as possible, to prevent sudden wheelies. If the bike starts to fishtail, drag your feet slightly to straighten out the forward motion.

The in-gear start must be approached differently. Don't put the machine in gear until the last possible moment; doing this too early will cause the clutch to heat up and slip when you do leave the line.

At the crucial moment when the starter is ready to wave you off, start creeping slightly forward, using your feet instead of the clutch. Don't rev the engine too high, as this might make you creep too much. When you do go, push off *hard* with your feet to aid the bike and keep the weight well over the bars.

As you accelerate, you probably will not be able to hear the engine at all because of the deafening roar of all the bikes around you. This makes it difficult to judge shifting points, and most riders will over-rev until they feel the vibration tingle the bars — which costs them valuable time.

Learn to shift by time. This takes a lot of practice and self-control, but it'll pick up many feet that would otherwise be wasted. Find out how many seconds it takes to run out each gear to the peak shifting-point, and count the time to yourself as you accelerate. The



... and pulled the CZ rider badly out of the hole.



If you have a small displacement machine, you can aid your start by pushing alongside until the 'r's get up, then hop aboard. The 400 shown here for demonstrative purposes will not have that problem.

old photographers' counting system of "one thousand, one thousand two," etc., works well.

The way you come off the line depends largely on the track surface and the actual condition of that surface. On a dry surface, you'll have to feather the throttle for maximum forward motion. On a really tacky surface, take off like the drag racers do . . . full throttle, with the body weight over the bars.

Again, as in all starts, observe the starter — try to psych him out. Take as much room as you can in the line. This is no place for overly polite gestures toward other riders. Stick your elbows out and keep the bike slightly crooked for maximum room. After everyone is lined up, then straighten out your bike. Give riders on each side of you all the room they want, and suddenly you'll find handlebars overlapping your gas tank.

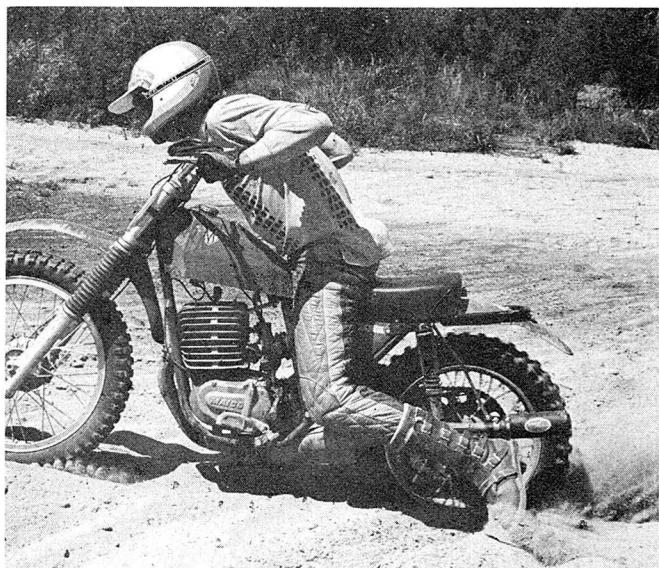
Don't indulge in any of the flashy wheelies or showy tactics coming off the line — they are time wasters. Concentrate on getting into the groove before anyone else.

Quite often the difference between being first into the corner and just being a part of the pack is keeping the throttle on a fraction of a second longer than anyone else. Most riders shut off too early and find out they could have kept accelerating deeper in the corner.

This is the big difference between the fast starters and the run-of-the-mill boys. Many times you'll see an entire pack approach a corner tightly bunched up without any real leader — then one rider will keep it on for that particle of a second longer and spurt clearly into the lead, while the pack behind him clang bars on each other's bikes.

If infighting is unavoidable, then keep one rule of

thumb handy: Never bump someone's back tire with your front tire. You'll go down like a stunned ox if you do. Whenever possible, pass on the inside line. It's not too hard to force a rider wide, but it's murder to force one inside. An inside pass enables you to use the outside rider for a berm if you are forced to go wider. Either that, or he'll move back and let you take your desired line.



No matter what kind of terrain you're starting in, get well forward when dumping the clutch. Failure to do so may cause the engine to bog, or the front end to come up — either one will cost time.

THE THIRD METHOD of starting is gaining rapid favor in this country, but has been employed in Europe for some time. Mechanical barriers and rubber-band starts eliminate much of the cheating that exists in the live-engine starts. Probably the best system is the rubber band, which is really a long piece of surgical rubber connected to a release ring triggered by a solenoid. The only way to gain any kind of an advantage on this mechanism is to place yourself right next to the actual mechanism and watch for the release to lift.

Most of them have about a half-inch of slack in the take up; this must be lifted before enough tension is available to release the rubber band. When this ring jiggles, hit it! But hang back a foot or so more than you normally would, because the older mechanisms become worn and have a slight lag in the reaction. If you hit the band as it was released, it would yank the front wheel sideways as it got tangled in the spokes. Very embarrassing.

Gates are harder to read than rubber bands. About all you can do here is hang back a few feet, then creep slightly forward when you feel the gate is ready to fall. One thing all the mechanical starts have in common is that the first turn becomes more crowded than with the other starting styles.

In this situation, it's wise to consider an outside line, as the corner may have congestion and pile-ups.

Quick starts are like any other part of racing. It takes constant practice to improve. Most riders neglect this part of the sport — and suffer because of it. Not everybody can be a Tim Hart or John De Soto off the line, but every rider can learn by watching riders of their caliber as they put quick starts to good use. *



Don't put the bike in gear until the last possible moment. Here Mark Blackwell holds his clutch in, but has not yet engaged low. This will keep the clutch from heating up and possibly slipping. Again note that Mark is lightly poised and well forward, awaiting the flagman's signal. Total concentration is a must.



Too much weight to the rear caused No. 8 to wheelie and forced him to roll back slightly on the throttle in order to recover. Check the body position on the other Husky.

CORNERING-

What You Must Know To Win

Straightaways are neat — you can go like hell and make lotta noise with your engine and everybody standing off to the side thinks you're a real hotshoe. But at the end of most straights, you'll generally find some sort of a corner.

Here's where you'll find the spectators who really know what to look for. This section of the course quickly

sorts out the men from the boys, and provides the real action.

If you're a cornering ace, then you are a racing ace. Most races are won in the corners, especially so in the more competitive classes, where all the front runners have about the same horsepower.

What we are trying to learn here is how to corner in the best, fastest,

safest and most intelligent manner. Anybody can gas it between the turns, but it's the man who can corner who will take the checkered flag every time.

Let's break down a turn and see what the rider is faced with. You are in the middle of a straight, traveling at, say, 60 miles per hour. Directly ahead of you is a right-hand corner





Keep your eye on No. 120. Even though he's well back, he is not allowing himself to be bottlenecked up in the first turn along with the rest of the pack.

that you must negotiate in order to get to the next straight. Simply put, all you must do is make the motorcycle change direction. Not too difficult-sounding a task — that is until the rider takes into consideration all the variables that face him.

That turn can consist of anything from a hard dirt surface to loose sand and dirt, to mud, or rocks, or even hard baked clay. Or any combination of the above. Take all of these variables and convolute the turn into a twisting rutted nightmare that may also be off-camber, and you see that the simple-sounding change of direction can indeed be a mind-snapper.

Back to your basic problem — how and what is the most efficient way around the turn. Two quick answers: the quickest and/or the fastest. That "and/or" is placed in there for a reason. The fastest may not be the quickest.

Remember the old drag racing bit? Where one guy turned an incredible

speed, only to get beaten by the other man who crossed the timing lights first? Same thing in racing, but we have other factors besides a straight line charge entering in.

Analyze, for a moment, a fairly ordinary turn on a motocross track. It's about 20 feet wide, flat and rutted, with a slight berm on the outside. Near the inside of the turn is a worn path, or groove, that all the riders are taking. Immediately after the turn, one finds a 70-yard straight and another turn. The maximum speed attainable to the entrance of our hypothetical turn is approximately 40 miles per hour.

Upon approaching the turn, the rider must make a snap decision: Should I just follow the groove everyone else is taking, or shall I go high on the berm and attempt to pass through at a greater speed?

And if I go high, what will I gain? And what will I gain if I follow the groove?

The answers depend largely on what is happening in the turn at the time.

Let's break it down into what a rider is likely to face during a normal race.

A CROWDED TURN

If there are several riders in the turn and they are all in the groove, and you decide to also use the groove, then *you will not be able to go faster than the slowest rider in the groove*. In fact, this rider may even cause you to go slower than he is riding. No train ever passed the train in front of it on the same set of rails. This, in effect, is what staying in a crowded groove is — staying on the rails.

Realizing that you cannot pass in the groove, you are then faced with the question of *where* you should ride in order to pick up some valuable ground. You realize that you'll be able to go faster if you go high



By swinging wide and taking a line out of the groove, he was able to pull up to second place with ease, and shut off No. 105, who was playing follow the leader in second place.

on the berm, but you also realize that the distance to be covered is greater, nullifying much of the greater speed. If you try to go inside of the groove, the distance is shorter, but the speed must be physically less in order to negotiate the turn without crashing. How, then, does the rider make his decision?

The answer should be based on what lies *after* the turn. If a fairly fast straight follows the turn, then the high (faster) line would be the one to take.

If another turn comes up rather quickly after the straight, then the rider is infinitely better off taking the low line. In this instance, his slightly slower speed will not hurt him, but might actually help ease a quick directional change and knife under a slower rider who is unable to flick his bike over the other way *because* of a higher speed. *It is easier to change direction on a slower bike than on one traveling at slightly higher speed. By shortening the turns, the rider is actually increasing*

the length of the straights between turns.

If he fails, however, to take advantage of this — by getting his machine vertical quickly and accelerating at the earliest moment — then he will lose time instead of gaining feet. *Maximum acceleration can only be obtained with the machine vertical to the ground.*

If you doubt this, time yourself through a gentle sweeper, then take the same distance on a straight line under the stopwatch.

Which brings us to the simplified approach to cornering. This is probably the easiest method to master, and can be perfected in the shortest time of all methods.

A SIMPLIFIED APPROACH

There are as many different approaches to cornering as there are motorcycles. Each approach must take into consideration a number of different things, such as type of terrain, the heaviness of the traffic on any given corner, type of racing, etc.

Some riders like to corner a la scrambles style — foot down and the rear end sliding out. Others, notably motocrossers, use the berms like balls on a pool table. Still others like to track smoothly on the groove.

All of the above-mentioned cornering styles take a certain amount of skill that isn't easy to learn. Most average riders (or less than average riders) will have difficulty mastering these techniques. It has been estimated that it takes at least five years to ride competitively in the top 10, especially in motocross.

The approach we are going to analyze and explain to you is simple, yet effective. If you consistently run in the lower half of the pack, this technique will almost immediately place you in the upper half. Once you get the new approach down pat, you should run in at least the upper third. And if you work on this new approach for one year, you should be consistently running in the top 10 and possibly challenging the leaders.

This approach is simple in itself,

yet utterly effective. It works something like this:

Picture yourself on the starting line of a motocross course, next to a riding partner, who's just about as fast (or as slow) as you are. The course is relatively empty and you are just play-racing. At a mutual signal, both of you let the clutch out and charge for the first corner. More than likely, you will go plenty deep into the corner before you shut the throttle off. Probably deeper than normal. One rider will make it through first, then the other will usually settle down behind and play catch up or follow the leader.

Now, picture if you will, how hard you went into that first corner. *If every corner on the course was approached in that same charging manner you would cut at least 10 percent off your lap times.* Read and reread that last sentence over a few times. Let it sink in a bit.

Most riders try to do too much, without sufficient skill, thereby wasting a great deal of time. Impose a mental picture of a long straight, with a sharp right-hander at the end. Now ride your imaginary bike down that straight in a straight line as fast as it will go. At the last possible moment, hit both brakes *hard* to scrub off the speed. If timed properly, this should place you right at the entrance of the corner. Now, with no fancy stuff, square the corner off as tight as room will allow, straighten the bike up quickly, and accelerate as hard as the bike will pull.

On super-sharp corners, this technique will almost bring your bike to a halt and the turn will be nothing more than a fast pivot. While not flashy looking, this is an effective technique and a very safe one. Refer to the line drawing and study it for a moment or two.

As you can see, the actual turning, or pivoting, point occupies very little time. Most of the actual ground is covered under acceleration or hard braking. You don't have to be a superb cornering pro, *just a confident braker and a hard accelerator.*

This technique offers some side benefits, among which are safety and simplicity. You can ignore the "groove" that most other riders will be taking. Just pick the straightest line and concentrate on going in as deep as possible. This way you don't have to worry about searching for a line. You know where your line will

PIVOTING OR TURNING POINT

ACCELERATE

HARD BRAKING

ACCELERATE

Figure A

be on each and every corner. As you become more efficient on judging how far you can penetrate the corner before braking, you will get faster and faster. When you feel that you have reached the optimum in braking efficiency, then you can concentrate on pivoting faster and more efficiently.

The fact that your machine re-

mains vertical most of the time means less crashes and spin outs — a definite plus for keeping the body in one piece. You will spend less time fighting the bike, because the bike is not slithering all over the place. Your sole function will be to turn the race course into a series of straight lines.

What do you do if someone is blocking the line you want to take

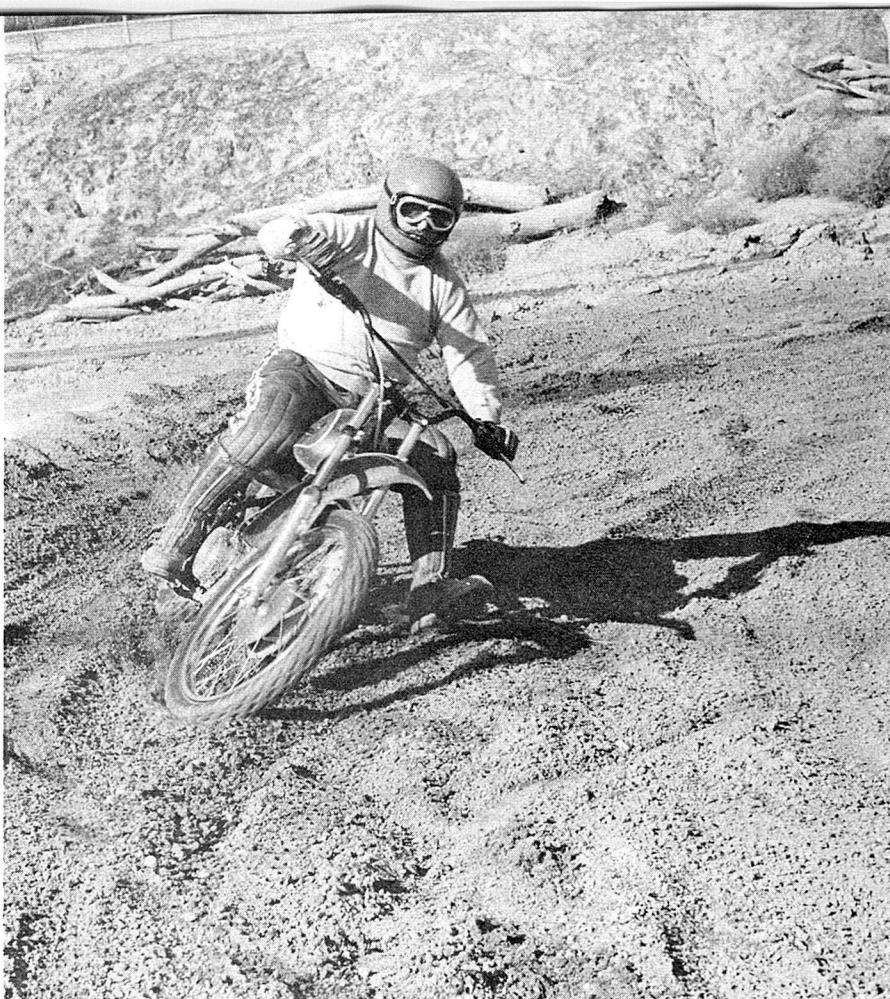
HOW TO WIN AT RACING

through the corner? Simple. Just take the same line of flight you have been taking, but move off to one side a few feet. Your approach and pivot should be on a parallel with your normal line. If everything is blocked, just cool it and wait for the next corner. They are rarely all blocked.

When attempting this approach to cornering, you will more than likely have riders criss-crossing all over the turn as they wildly shoot from one berm to another. For the large part, you can ignore them and they will have to allow you room in the turn. Why? Because your machine will be vertical and under power and theirs will be heeled over. Any contact and they will more than likely go down. A vertical machine is much more stable and will out-accelerate one that is leaned over. This will normally allow you to spurt ahead.

If you're having trouble in the corners, try this different approach. It works for some of the best riders around.

Most of the success of the simplified approach to cornering lies in the proper use of the front brake. If you can't use it confidently, then the



Never stay on the outside line any longer than necessary . . .

. . . as soon as possible, square off the corner and get the power on.



simplified approach rapidly becomes the terrified approach.

THE FRONT BRAKE — KEY TO CORNERING

The front brake is 75 percent of your stopping power. Its judicious use enables you not only to go much deeper into corners, but faster down hills, plus a multitude of other benefits. The front brake's effectiveness is so great not because of the efficiency of the unit, but because of weight transfer. This is graphically illustrated by the diving lunge most riders experience with any strong brake application. Assuming front/rear weight distribution is about equal on your machine, an additional 25 percent or more of the machine's weight will be transferred from the rear axle to the front axle. If the rear brake is used alone, the bike's stopping effectiveness now becomes only 25 percent of the total possible braking force.

Rear braking alone also induces unwanted slides and hopping, quite often killing the engine in the process. Once that engine is dead, the



Here Jim Connolly takes the inside line for the shortest distance through a turn. Even though Jim had another 30 feet to play with, he passed up a number of riders by staying inside.



Going too far to the outside is a waste of time. This rider could have saved valuable seconds by stuffing the bike in tighter.

bike becomes a nearly uncontrollable projectile. Add a choppy, rutted surface to this situation and you can see how everything from a simple crash to a locked rear wheel endo can come about.

The greatest fear in the mind of the inexperienced rider associated with using the front binder is that of locking the wheel up and going over the bars. Believe it or not, this is a physical impossibility, as long as the machine is level and straight up and down. A crash can easily occur, however, if the front wheel is the least bit cocked, or "crabbed in." Once that front wheel is off the center line, it's all over and a full lock high-speed spill is in order.

The best braking to date, on asphalt under perfect conditions, is not much over 1.25 Gs. In the dirt, this condition does not exist, and the most that can happen is loss of traction on the braked wheel. The 1.25-plus G readings were achieved using both brakes and could not be reached using the front brake alone. Even under optimum front braking conditions, the maximum the front brake alone can generate is around 75 percent of the total possible G force generated. Carrying this a bit further, let's assume your machine can stop



Turning can be simplified by pivoting sharply in a short distance, rather than by keeping the bike leaned over and sawing at the bars through the entire turn. The idea is to get the machine vertical and driving as quickly as you can.

from 60 miles per hour in 100 feet, using both brakes. Using the rear brake alone, would raise the distance required to stop 75 percent, and using the front brake alone, (very unsafe) would raise it only 25 percent.

Dirt racing is vastly different from road racing and even though G loads, weight transfer and the like are controlling factors, they must be modified slightly to fit the uneven, un-

stable dirt surface. Since this surface can be anything from hard packed yellow clay, to axle-deep sand, to bottomless Eastern mud bogs, the braking techniques applied must be modified accordingly. Naturally, the most effective front braking is achieved on a hard surface, where the brake lever may be grabbed firmly, almost to the point of inducing wheel lock. In deep sand, the front brake should be brought on gradu-

ally to prevent the front wheel from knifing in sharply, especially so with a narrow 21-inch front wheel, or at high speeds in a sand wash. In the muddy stuff, a gentle touch is also the answer, more so when water is covering the mud and the surface beneath is not visible. Rocks, shale, wet rocks and loose rocks should all be treated with utmost respect, as too much pressure, front or rear on braking, can produce instant wheel

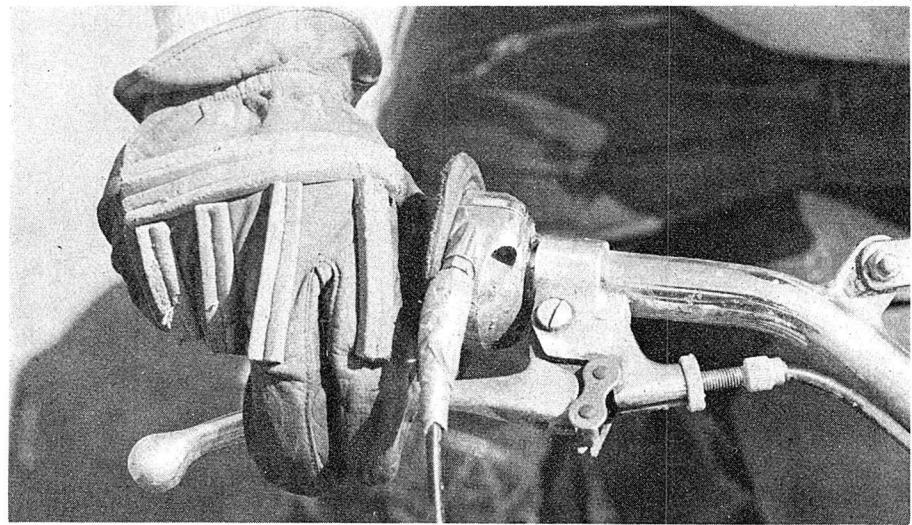
lock. If possible, try to do all of your braking before you reach this kind of terrain, and accelerate slightly over it. One finger on the front lever, when you must brake is the answer. If you do lock up the front wheel on any of the above, release the lever immediately and try to get rolling again with a quick blip of the throttle. After the wheel is free rolling, resume braking.

Possibly the single most effective use of the front brake is on a steep downhill section. How many times have you locked up the rear end and had the machine swap ends during the descent? As long as that front wheel is kept perpendicular to the surface on a downhill, you can use that front brake and the machine will travel in a straight line. If you have to go around a turn or an obstacle during the descent, let go of both brakes momentarily until the machine passes the point in question and straightens, then apply again as necessary.

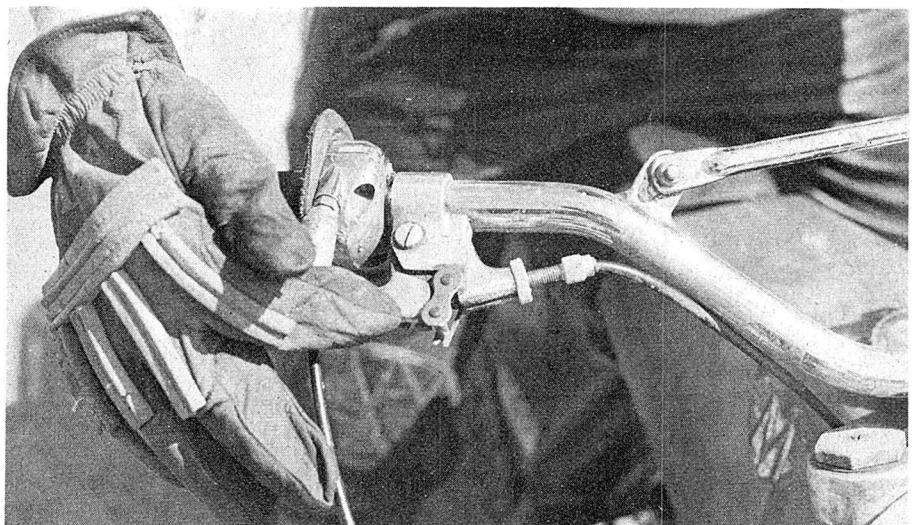
Off-camber surfaces are death to braking of any sort, because so little of the tire "footprint" is in contact with the surface, and locking up either wheel becomes frighteningly easy.

Most riders seem to delight in keeping their brake lever adjusted incorrectly; that is, no braking action until the lever is almost touching the grip. They seem to feel that this is the safest approach. A little logic (plus observing the European aces) shows that if the lever is adjusted so that the action starts near full extension, the lever can be operated with one or two fingers, instead of a ham-fisted hand. This offers the side benefit of being able to maintain some sort of a grip at all times, very important when negotiating rough terrain. One dangerous thing about having the lever work too near the throttle, is that of brake fade. After a few really hard applications, you could suddenly find yourself with no braking action at all. No one adjusts their rear brakes to the point of sloppiness; why should the front brake be otherwise? Also your hand is much more sensitive than your foot and one finger is more sensitive than a whole fistful.

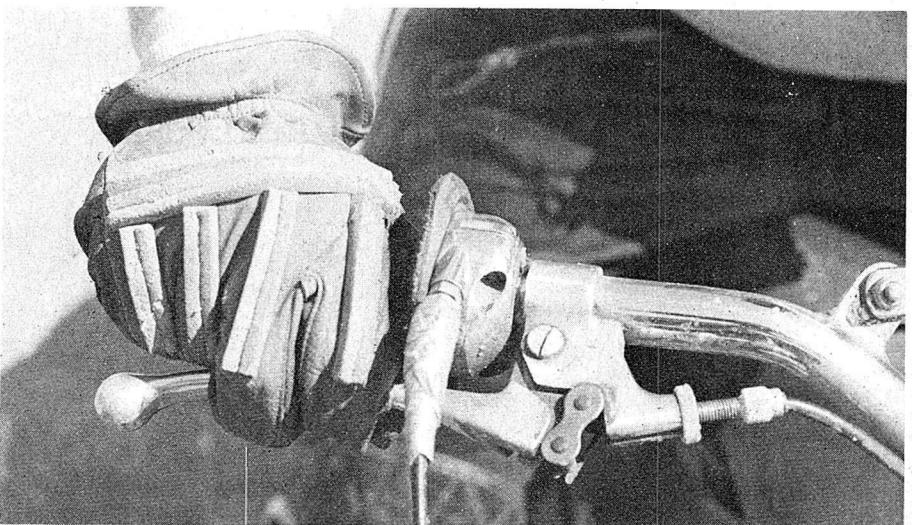
When adjusting the front binder, make sure that the shoe does not drag at full release, or you'll probably find a spill on your hands. Make it sensitive, not grabby. Once you get used to the procedure of braking



The front brake should be set up so the rider does not have to stretch to reach it. A good brake should be operated with two fingers and still slow the bike.



Here, a master link brings the brake lever back to comfortable reaching distance. There is no reason for the rider to reach a long way.



The front brake is locked up completely and the lever has traveled less than an inch. This is the most efficient setup for easiest braking. If you are doing it any other way, you are doing it wrong.

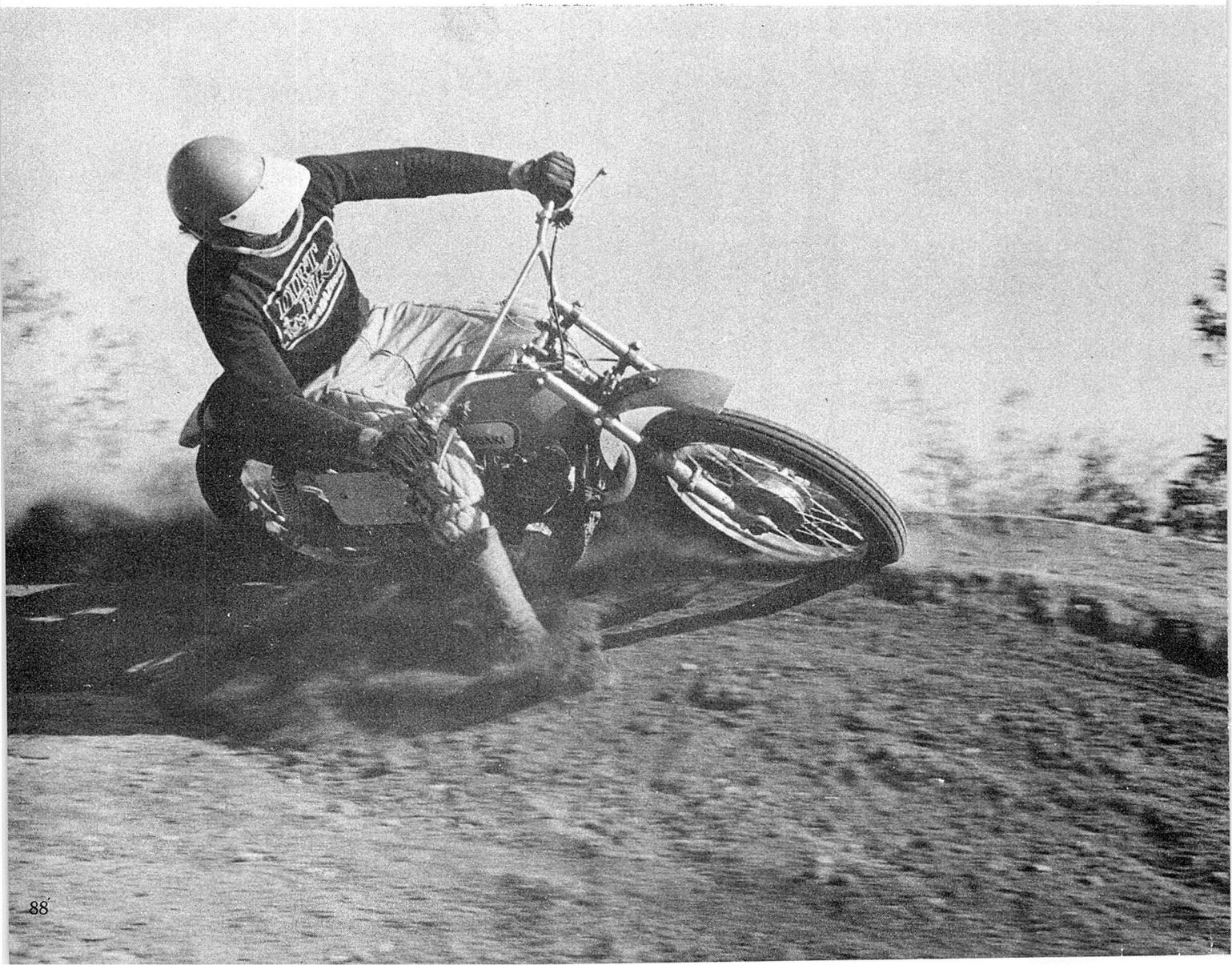


Weight transfer is graphically illustrated showing just how much force is transferred under heavy braking. Note the front end diving.

properly, you'll find that lap times will come down, as you go deeper and deeper into the corners before you have to shut off. Even if you're not racing, you'll have more control for pleasure riding, and a lot more confidence. Just take it easy and get the feel of the front grabber. Learn the unit's (and your) limitations, until you are able to come as close as possible to the ragged edge before you turn it off.

Once you have mastered front wheel braking, you are ready to move on to the more highly refined forms of cornering, not because they are necessarily better, but because they offer the rider an alternative. So far, we have largely been dealing with a crowded turn, but what about the occasions when you have the turn to yourself.

A berm can be a great aid in cornering at high speeds, but don't ride up near the very lip like this rider. The margin for error is slight and you can over-ride the berm if not cautious.





De Coster makes full use of a wall for a berm. While this can be done, the chance of injuring the high-side foot is great. Play it safer and stay a tad lower unless your name happens to be Roger.

THE OPEN TURN

Let's say no one is in front of you on a corner up ahead, and your sole concern is just how fast you can get through. Naturally, the berm is an obvious thing to consider. Going up high will allow you a higher entrance speed and a higher exit speed

and you have a following straight to take advantage of the speed. How should a berm be used?

A good rule of thumb should be considered. Slide into a berm, don't try to start the slide once you're up on it. The sole purpose of using the berm is to reduce the amount of

time you spend in a corner. Remember, you can always take a corner with a berm at a higher speed than a similar flat one.

You must drive the motorcycle off the berm with power. Since the front wheel doesn't put forth any power, it then becomes fairly ob-



A berm is best used when a decent straight immediately follows the exit.

vious that the rear wheel must do the work. The front wheel should be used to "set the bike up," in the proper position, and to start the directional change. The rear wheel, under power, must complete the transition. The technique to use is as follows:

Approach the berm at a higher rate of speed than if the bike was on level ground. Stuff the front wheel well into the berm; you'll feel the front forks compressing when this is done properly. Then immediately apply power, allowing the rear end to swing or slide into the berm. Keep

the power on, with the body weight well forward and drive off the berm. Done properly, you'll feel like a pool ball that has bounced off a cushion.

Two valid reasons for keeping the weight forward: It keeps the front end of the bike on the ground (or at least close to it) preventing a

loop, and enables the rider to break the rear end loose easier and much more predictably. If the rider sits down with his weight back, a thrust on the throttle tends to straighten, or right, the machine. This can hurtle a rider right over the berm

and right into God-knows-what adventures.

The berm can also be used to save your skin at times, if you are taking the low (inside) line and happen to overcook it a taste. Don't panic — let the machine slide into

the berm (under power), then gas it to thrust you back down into your intended line. One good rule — *if you back off that throttle while stuffed high up into a berm, chances are excellent you'll climb right over it. It takes a healthy handful of*

Even a few inches of dirt can be used as a berm. Only a small portion of the tire makes contact with the ground. In soft ground, a rider can build his berm as he goes as long as the bike is under power.



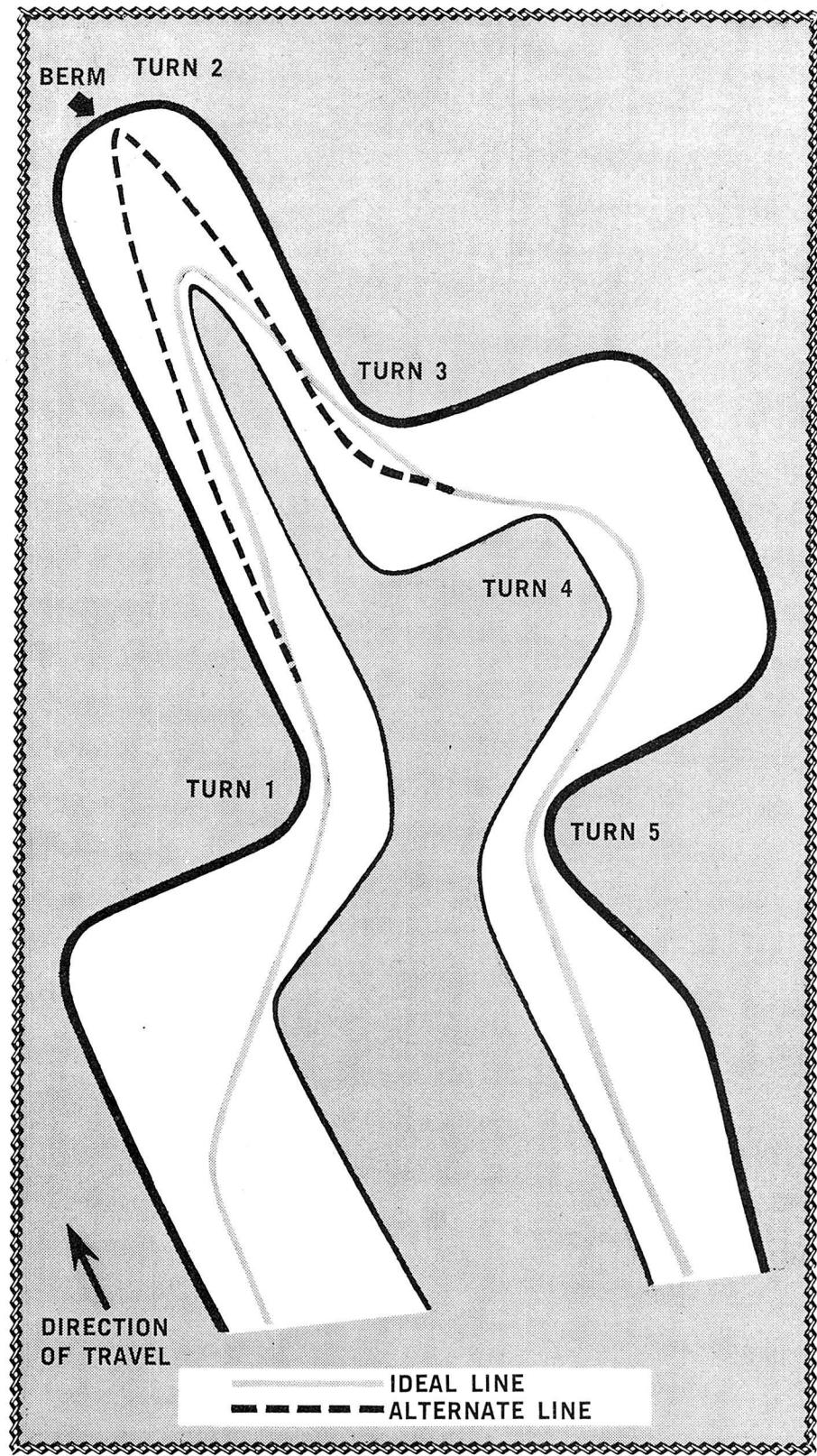


Figure B

power to keep you there and drive you back down out of that lip.

Now that you have some basics on what lines are available, how do you pick your lines?

PICKING A LINE

What you are attempting to do on the race track is to make a bunch of

straight lines out of a bunch of crooked lines, in the shortest time period.

Figure B shows the theoretically perfect line for a series of turns. Here we can see the logic at Turn 1. We have straightened out the gentle right/left sweeper into a nearly straight line, obviously the fastest

and most efficient way through. There really is not much of an alternate line, and if there were traffic in your way, it would be advisable to wait until the next turn to attempt passing.

Turn 2 gives the rider an option. The solid line shows the shortest way through and the one that gives



Picking a line is nothing more than a matter of straightening out the turns. Again, the bike should be kept vertical and driving whenever possible.

the best approach to the *next corner*. The dotted line shows a line to be considered if the corner is crowded with slower riders, but leaves the rider with a less than ideal approach to Turn 3. The inside turn gives the rider a nearly straight shot through Turn 3, enabling him to ignore it.

It would be unwise to consider an outside line on Turn 4, because of the nearness of Turn 5. If the rider were able to attain a higher speed through the outside line, it would be nullified by the sudden change of direction needed on Turn

5. The wider he went to get the higher speed, the more difficult it would be to negotiate Turn 5. Plus the fact that the other riders could block him rather easily by positioning their machines in his line.

What the smart rider has done, in effect, is change five turns into two turns.

Of course, to do everything this smoothly requires that the track have no variables, which does not exist.

This is where the rider is well advised to ignore the "groove" that everyone is taking. It might look

rough off the groove, but if it is, in truth, the shortest and most efficient line, isn't it worth a few extra bumps and jolts to save the time? If you doubt this statement, just watch where the really fast riders do all of their passing. It sure isn't down the straights, or in the smooth easy turns — it's where their opponents least expect it — in the rough stuff out of the groove.

And that, baby, is what cornering is all about — passing where you are least expected — and that's where the race is won.

RACING UNDER MUDDY CONDITIONS



There is a certain group of enthusiasts who like mud. Spectators. And they're just about the only ones. Riders, as a rule, can't stand the stuff, and for good reason.

Not only is racing in the mud yucky and nasty, but it does horrible things to both bike and rider. Goggles get loaded with gorp and vision becomes distorted, or worse. And, of course, the ultimate in horrors — a fall in the mud that leaves the rider and his machine looking like part of the course.

We're not going to attempt to tell you that this article is going to turn mud magically into something like the San Diego Freeway (the best riders still crash in it), but it should help you somewhat.

The best method is, naturally, avoiding mud whenever you can. While this is not always possible, at least you

can, with a little intelligent riding, go through the least amount on the course.

A good rule of thumb is: Don't ride right through the middle of a mud hole. Whenever you can, skirt the mud hole. It's usually not as deep at the edges and normally offers better traction.

This means that you will probably have to change direction to get to the "good part." Always make your directional change *before* you get to the mud, not in it, no matter how smooth it looks. If you must swing wide in order to get to the outer edge, it will cost you some time, but will surely be worth it.

To find out the best lines through a mud hazard, study other riders going through before your race. You'll probably see the fastest riders heading for the sections

that are not covered with water. It's better to choose a deeper rut that you can see, in favor of something that you can't see at all.

As you watch the riders go through, see which ones throw up a large sheet of muddy water. The larger the splash, the deeper the water and — the softer the mud below it. The softer the mud, the more it wants to grab and swallow a wheel.

However, deep mud is not the most dangerous type. The worst stuff is the thin layer on a hard smooth surface. In this, the tire cannot sink down in and get a bite. The knobs are all that is making contact and they cut the contact area in half, giving marginal traction at best.

The worst that normally happens in deep mud is the forward motion of the bike coming to a halt. It's not uncommon to see a bike up to the axle in mire.

The thin-layer mud is what puts a rider down. If you have to choose between the two, some factors must be taken into consideration. If you want to accelerate strongly and keep the revs up for what follows the mud, then the deep stuff is the way to go. If, however, you merely want to make a light throttle, or no throttle transition over the ground, then the thin layer should work out best.

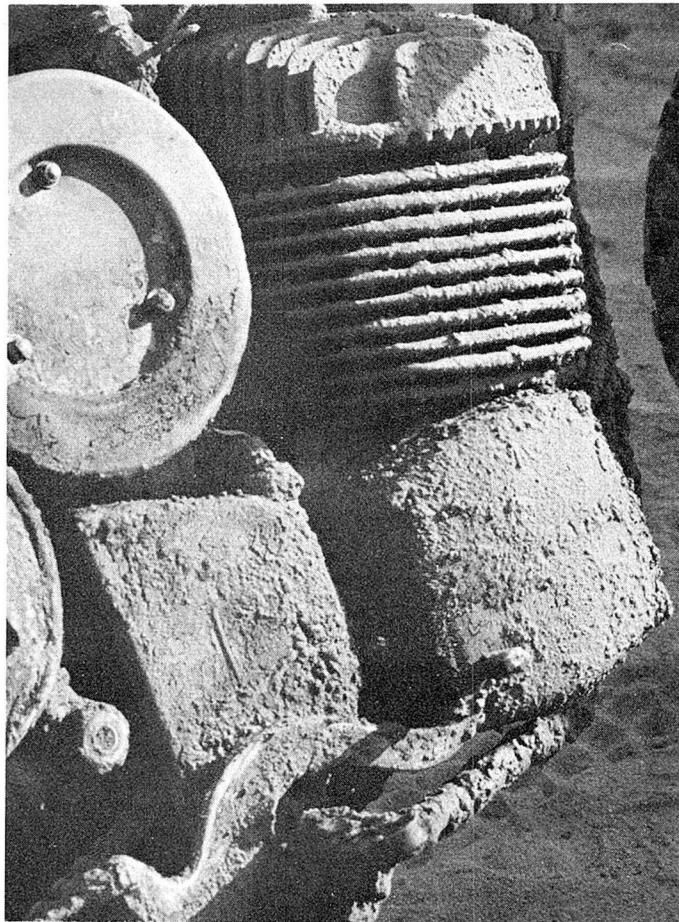
In the deeper mud, the rider can spin the rear wheel without too much fear of falling. The rider should be on the pegs, weight to the rear for maximum bite, with the rear tire churning away. But don't churn too much — it's far too easy to dig a trench.

Let's assume that you're entering a mud hole in second gear, with the engine on the pipe. Suddenly you feel the engine bogging down, close to the point of stalling. At this point, a momentary body weight shift forward will usually let the rear wheel spin free. When you hear the revs rise again, then resume the weight-to-the-rear stance. By "rocking" back and forth like this, the rider can prevent the engine from stalling, and maintain a constant pull. In a situation like this, shifting to a lower gear would probably cause loss of forward motion, enough to cause the bike to dig in and bury itself when power is finally applied in the lower gear.

On the slick surface, with the thin layer of mud, the idea is never to allow the rear wheel to spin and break its tenuous grip with the ground. The key here is to shift up to the highest gear the bike will pull. Make the machine lug. If you must negotiate a turn on the slick stuff, don't be bashful — put a foot down, but keep the foot well forward. This serves two purposes: It acts as a brace if the bike should start to go down, and it puts additional weight on the front wheel for maximum bite. As long as the front wheel has decent bite, the rear end can squiggle around some without too much in the way of problems.

If, however, the rear end starts to move around and the rider's weight is to the rear, then it's all over but the shouting. If the bike does start to go into a slide, get up on the outside peg and plant the foot firmly on the ground. This gives you a three-point contact base, and a fairly stable one at that. Using discreet amounts of throttle, this stance enables the rider to have maximum control while sliding on mud. I have seen riders in this stance spin completely around in a full circle and still not fall down.

When several riders are entering the mud hazard at one time, try to get your bike in the "cleanest" posi-



Mud-caked fins can kill an engine because of heat buildup. Clean your engine between motos if you want it to live.

tion. By cleanest, this means that the rider should attempt to *not* be hit by flying mud. If the rider is on the outside and another rider is in the deep part of the hole, he will more than likely get drowned by the spray. Also, a rider directly behind another rider will usually get a face full of mud from the spinning knobby.

The best position is either in front of everyone (obviously), or to the rear and off to one side. Don't get too close if you assume this position; stay back approximately 2 bike lengths.

Most mud hazards form a groove or two — from the path riders are taking. Often, this groove will get so deep that feet can be ripped from the pegs. If the groove gets that deep, then it's time to get out of it and hit some untouched sections. You are much better off wallowing through some fresh goop, than having the bike come to an abrupt halt — and having you continue over the bars.

Fresh goop is the biggest power robber in the racing business. You must hit this stuff with all the revs the engine can muster, and stay on the pegs for control. Never turn the bars when attempting this type of mud, although the machine can be leaned well over for maneuvering. You build your berm as you go.

Never wheelie through mud, unless you are sure that you can keep the front end up the entire distance of the hazard. The reasoning is simple: If the front wheel should come down in the hazard it can easily induce loss of control.

Machine preparation is a must for serious mud. Slip-



Never ride directly behind another rider in the mud — that is unless you like a face full of mud.

pery metal pegs, or rubber covered items, are a sure bet to cause the boot to slither off at a crucial moment. A saw-toothed, or cleated, peg is the way to go. Even better are the open ones. These allow the mud to be forced through, rather than build up under the rider's boot.

Try to keep mud from clogging up the fins. If this means that you have to put a small shield on the downtube, then do it. An engine with no air passing through the fins is going to heat up quickly and possibly seize. Quite often, a simple mud flap on the lower edge of the front fender will do the trick.

Between motos, it's a good idea to clean the mud off the engine, because once that stuff dries, it's like adobe brick and you'll need a chisel to remove it.

Shrouds, or duct tape, must be placed at critical areas, like the air cleaner box (or cover) and the carb and carb hose. It's also a good idea to protect any exposed electrics with some strategic shielding. Especially those coils mounted under the tank. Mud can accumulate and dry in this area, causing everything from cracks in the insulation to vibration and/or pressure breaks.

Smart riders also make their goggles "mud ready" if they know in advance that conditions are going to

be on the sloppy side. The trick is to burn a small hole in the plastic lenses, directly in front of the eye. The hole should be cleaned up with a razor blade, with the goggles off, naturally. This way, if the goggles should happen to get completely covered with mud, a swipe of the hand will clear the hole, allowing a remarkable amount of vision. The hole should not be bigger than a cigarette burn, or mud will enter and get on the rider's eyes.

If much of the course is muddy, it's best to lower the tire pressure considerably for maximum traction. If the entire course is muddy, you might consider going as low as 6 or 7 pounds in the rear tire, and 5 in the front. If pressure is run that low, two rim locks on the back are a must.

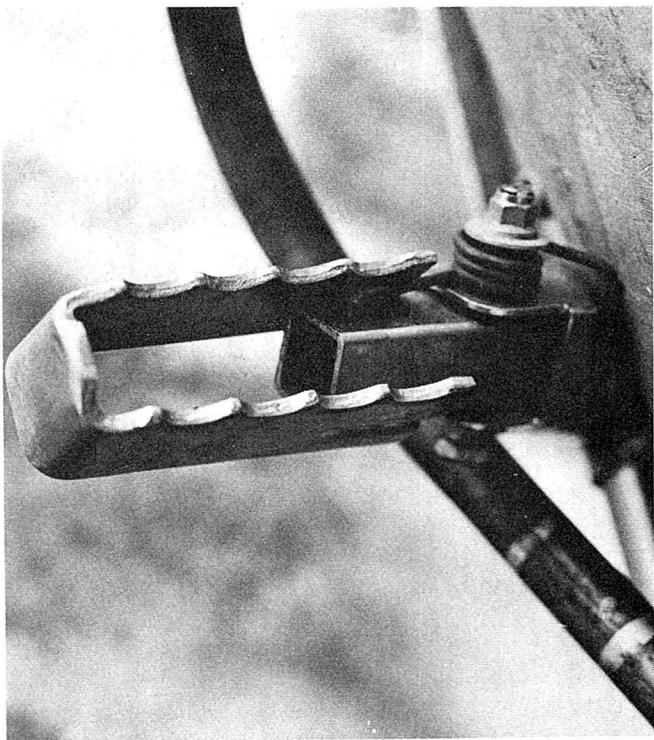
If you spend a great deal of time riding in mud, do not use alloy rims on your machine. They have a ridge that will accumulate mud and add many pounds to the weight of the wheel. And it will put the entire wheel severely out of balance. Conventional rims are more than strong enough under muddy conditions and will throw the mud off quickly once enough speed is attained.

Protective covers should be used at control cable junctures. If mud is allowed to remain there while the cable moves in and out, grit will work down into the cable housing and cause movement to slow down, or stop completely. If you don't want to spend the money for custom covers, some sections of inner tube can be wired in place — offering decent protection.

SUMMATION OF MUD MASTERY

If you must attempt any turning on slickety surfaces, then by all means don't lean the bike much. Try to use body lean while keeping the machine fairly upright.

The more vertical the bike is, the more tire contact



Avoid rubber covered pegs for mud riding. This sort of peg is the only way to go. It offers grip in the worst going.



In deep mud, the rider can keep the rear wheel spinning and lean the bike well over. The opposite is true on a hard, slick surface.

is maintained with the ground — and the less floundering one will encounter.

Other than these mud riding precautions, common sense is the best guide. Don't make any abrupt moves

and keep everything as smooth as you can. Try to maintain maximum tire/ground contact and don't make any sudden, lurching mistakes. Better yet, don't ride in the mud. It's really not much fun at all.

ROCK RIDING-

NOBODY'S FAVORITE



There are some rocks that you ain't gonna climb, no way, no how. This is probably one of them.

Many very competent riders—riders who do well at motocross and scrambles—suddenly panic when they are faced with bypassing, going over, or going around rocks. They really should not have such trepidation. A rock is nothing more than another obstacle to be overcome. The only thing you must bear in mind is

that a rock is a totally unique surface. A rock has all the undulations and ripples and deformities of all other surfaces, except that it is unyielding, to a point. Small rocks that are lying on top of other rocks have a habit of shifting. A shifting rock acts much like marbles on top of other marbles. If you consider the wheel of a



When descending a large rock, get the front wheel straight and ease it over, with the front brake off . . .



. . . and keep your weight balanced in the middle as you start the descent.

motorcycle a big marble on top of small marbles, you can see that it leads to a very skatey situation.

Let's assume you are in a normal cross-country race. A number of very simple rules borne in mind will make the passage over rocks much simpler and much safer and ultimately, much quicker, once you master these rules. The first, probably most important, rule is *keep that front wheel straight*. Any time the front wheel deviates from a straight-ahead line, when the wheel makes contact with a rock, you are in deep, deep trouble.

A certain amount of front wheel deviation is allowable, if the rocks are firmly embedded into the ground. However, one can never really tell when a rock is there to stay, or can be easily moved, especially when you are passing over it at a great rate of speed. Therefore your best bet, as previously stated, is to keep that front wheel straight.

This means that whenever possible, you should pick as straight a line as possible through rocks. Naturally, giant-size rocks, ones that cannot be ridden over, must be avoided. But the most successful riders are those who pick a line from A to B, and hold that line. You are much better off riding over a series of rocks, even if they look a little tough, than trying to jiggle or dodge your way around them. Of course, common sense will be your guide.

A rider can take a tremendous amount of impact from his wheel up to his handlebars, as long as he is going straight ahead. However, if the wheel is turned slightly, and a very severe impact is transmitted to the wheel, it is very likely that the bars will be ripped out of the rider's hands. Try to let your bike work for you, rather than against you.

The second rule, and one that ties in with the first, is keeping your motorcycle vertical. The more straight up and down the motorcycle is, the more control you



When the wheel starts to drop, get your weight well back, as far as you can, and don't touch the front brake as the front wheel makes contact. You can use the rear brake.

If the bike twists, plant a foot down to correct. Don't worry about picture perfect form. Just get down without crashing.

will have over the impacts that rocks are most assuredly going to transfer up to you. Which brings us to rule three.

As long as you know a certain amount of impact is going to be transmitted to you, you would be better off standing up on the pegs. Riders who try to ride rocks while seated, absorb most of the impact through their butt and their spine, tiring them quickly and creating an unsafe situation. As long as you are standing up on the pegs, it is much easier to make the necessary body weight shifts.

While it is desirable to keep the bike vertical at all times, in practice this proves nearly impossible. Therefore, if the rider is standing on the pegs, any and all body weight shifts can be made quickly and easily.

Rule four is one that takes some getting used to. Always try to use the highest possible gear you can. In other words, rather than going over a series of rocks in second gear with the engine screaming its guts out, it is better to go over the same terrain in third gear, with the engine torquing its way through, or loafing its way through. It just doesn't pay to over-rev. All you will be doing is creating useless wheelspin, and that rock may be loose and spin, causing an almost total loss of traction.

The idea, in a nutshell, is to disturb the rocks as little as possible as you are going over them. Rule five then must be, whenever possible, to torque your way over, rather than rev your way over any rocks. This naturally works best with the big engines. On some smaller-displacement bikes it may be necessary to play with the throttle or even slip the clutch in order to make headway.

The sixth rule applies even more to the smaller-displacement bikes than to the big bikes. Pick your line and avoid those big rocks. Once you get committed to a line, try not to turn. The smaller and less powerful your engine is, the more planning and picking is necessary. Where a 400cc motorcycle may be able to bull its way through a section of rocks, with "on again-off again" power, a 125cc racer does not have this luxury. Therefore, it takes much more intelligent planning to cover this terrain at the same rate of speed. This admittedly takes a certain amount of skill. Plan ahead, while still watching what you are covering.

Rule seven. Don't hit the sharp rocks, whenever possible. This can cause flat tires, squared rims and even destroyed hubs. This, of course, backs up rule six about picking a line. You can ride over some incredibly large rocks, as long as they are of the proper shape. Round rocks, rocks that have a smooth approach and a smooth drop-off, are not that difficult. The ones that are sharp transmit an incredible amount of force to a very small area on your tire or wheel. These are usually the ones that cause all the flat tires.

Back in rule one, we said that the rider must keep the wheel straight. There are obviously times when it is impossible to keep the front wheel straight. One of these times, naturally, is when the rider must turn the motorcycle, because that is the way the course or trail winds. In a situation like this, rule eight must read clearly: Keep your feet on the pegs and apply power when making a turn in rocks. That doesn't mean that you should grab a handful, like one does in deep sand,



but the power must be applied gently. The power must be rolled on. Failure to apply power, when trying to negotiate a turn at rocks, means that the rider may slip over and the wheel will lose contact with the rocks. Power keeps you on top of the rocks, rather than having the wheel wedged down in between the rocks, as long as the gyro effect, or the rolling effect, of the wheel is there. With speed and power up, you are able to climb over most rocks, rather than bump into them.

Draw yourself a mental picture if you will. We have all at one time or another pushed a wheelbarrow, heavily laden. Push this wheelbarrow up against a curb at a very slow speed and the chances are you won't make it over the curb. However, take the same wheelbarrow, back up, get a good run at the curb, then you will bump over, with very little impact felt.

Turning in rocks is much like turning in sand, with one very very important exception. This exception is, in sand you are riding in it quite a bit, where the tire is actually down in, and you can use that to build up a lip as you go. This doesn't exist in rocks, unless you have small piles of loose rocks, like gravel. Most people don't realize it, but rocks do give incredibly good traction. Tire contact on a rock is a very solid mating surface. As long as the rider can take advantage of this, there is no reason why he can't turn almost as fast on a rock as he can on a hard, dry surface.

SO FAR WE HAVE CONCERNED ourselves with going over rocks at fairly high speeds and avoiding the more difficult rocks. But there are times when a rider simply must go over an obstacle and speed is not the prime concern. Let's assume your motorcycle has 12 inches ground clearance and you are riding on a trail, and blocking that trail is an 18-inch rock. To get over an obstacle that big—an obstacle in this case higher than your ground clearance—the technique required is much different.

One thing you must bear in mind is, you cannot stop in the middle of that transition. You must maintain a forward motion. Approach the obstacle in a gear low enough to give you sufficient power to go over the obstacle. Between 5 and 10 miles an hour is generally enough for even the largest rocks. As you approach the rock, blip the throttle, lifting or lightening the front wheel at the obstacle. In this way you can use the forward edge of the rock and this will help you to get moving and rolling. If possible, keep the front wheel slightly airborne. When you can feel the rear wheel make contact with this large rock, roll back slightly on the throttle, but don't close it completely. You should have enough forward momentum at this time to let the rear wheel climb over the rock. Don't shut your throttle off completely. If you do, you are liable to hang the frame, or portions of the bike, up on the rock, and that could cause you to crash. As soon as possible, get the throttle back on again, even if it is only slightly. This way, if your front wheel hits first, which in many cases cannot be avoided, you still have some power to pull you out of it. A front wheel landing with the power off is almost a sure way to crash. This is one place where it is absolutely essential that the front wheel remains straight. Using this technique, rocks that could not possibly be climbed



When riding over medium-size rocks, ignore them and get your speed up. Instead of turning the wheel when making a turn, use body lean.

Turn that front wheel in the rocks, like this, and much of your control is lost.





Always go over the "fat" part of a rock. In this way, neither the rock or the front tire will slip . . .

through traction, can in this way be passed over by sheer momentum.

Up until now, we have just considered normal garden variety rocks, mainly level ground, dry rocks that are negotiable. Take that same rock, and place it in a stream, and you will end up with a slippery, wet, moss-covered obstacle, that requires the total and absolute utmost in concentration and throttle control. The key here is to maintain as much as possible total tire contact with the rock. When going across rocks of this nature, it is imperative to go over the fat or solid part of the rock. Any attempt to ride even partially off to the side would more than likely cause the tire to fall away, as well as brake traction and possibly a number of things on the bike and on the rider's body. This is absolutely the most difficult kind of rock to cover.

IF YOU ARE GOING TO DO a lot of riding in rocky country, then you must consider modification to your motorcycle. Most serious desert riders agree that a fat cross section front tire works best in rocks. This gives a wider surface than the normal 3:00x21 tire common to most dirt bikes today, and also transmits the shock over a larger area. Most of the entries in races like the Baja 1000, Baja 500 and Mint 400 make successful use of 3.50 or even 4.00x19 trials tires up front. Additionally, most riders lace the wheel in a cross four pattern for maximum strength.

Another trick used by most cross-country and desert riders, is wiring the spokes. Wherever two spokes cross, it is advisable to loop several lengths of safety wire around and twist them securely with a pair of pliers. This nearly doubles the effective strength of the wheels.

Most riders run anywhere from 12 to 16 pounds in their tires for normal riding or normal racing. How-

ever, if you know ahead of time that you will be covering largely rock filled country, you would be much better off riding higher pressures. The impact, of course, will be felt in your hands, arms and shoulders and will tire you much more rapidly, but it will prevent the tube from being pinched when the rider slams the wheel into many of the sharp edges of rocks.

Some heavy riders on heavy machines run as high as 30 pounds tire pressure front and rear. A notable amount of success has been achieved using the new 6-ply tires in the International Six Day-type tubes. This does, of course, result in a very, very heavy wheel. A 6-ply tire in an International Six Day-type tube weighs more than twice as much as a conventional unit in a conventional tube. However, they very rarely go flat. In fact, they are so successful that when a tire does go flat, a rider can keep on riding without too much difficulty. Most riders who spend a great deal of time racing or riding over rocks use a very stout skid plate and one that overlaps slightly, offering some protection to the shift and brake pedals. Serious riders will also replace standard items that are too brittle or unyielding with rebendable items. It is very difficult to find a new gearshift lever in the middle of a race, but not too difficult to bend a twisted one back into some semblance of workability.

Another must for the serious rock racer is a very good chain guard that will not deflect too easily from the blow of a rock on the chain guard itself. Failure to incorporate a chain guard on your motorcycle might mean a rock knocking the chain off of a sprocket, or possibly breaking the case in the process. If this happens 26 miles out from nowhere, it is not only the end

. . . like this. There is zero traction to be had on the side of any rock.





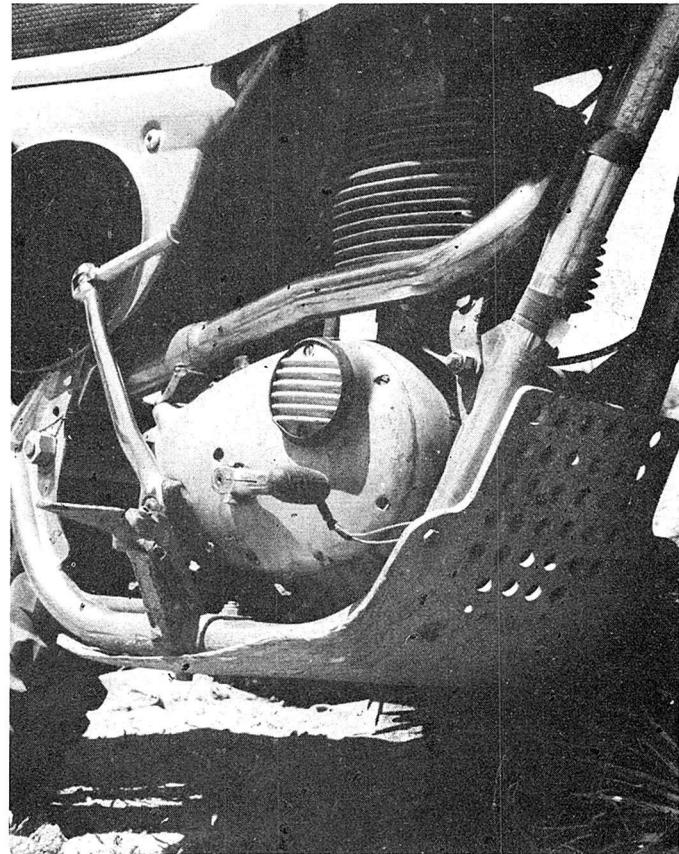
Attempting to ride between two close rocks can result in a front wheel being twisted right out of the rider's hands. Either go over or around.

of a long race, but the beginning of a long day, or even long night, for the unwary rider.

There are situations where rocks can be used to the rider's advantage. However, these are very few. One would be an off-camber slope. Here the rider, if he is cautious, can use the rocks as berms. However, the steeper the slope, the more tendency for the rock to roll away from the wheel making contact, thereby causing the rider inadvertently to lay his machine down. Areas of loose, small rock, or gravel rock, can be covered at a very high rate of speed and can be treated much like deep sand. The key here is speed. And lots of it. Even though the machine may feel very spooky, while covering gravel rock at high speeds, the faster you go the more stable your machine will be. It just takes some getting used to.

ONE TYPE OF ROCK FORMATION that puts fear in the hearts of even strong men is the rock whoop-de-doo. This is just like a normal undulating section, except that it is composed entirely of rocks, most of the same size. The secret here is to keep both wheels on the ground as much as possible. In normal sand whoopdies, riders lift their front end over an obstacle and carry it through the air for some distance, place it down, then lift again and repeat. On rock, the front wheel should stay in contact with the rocks as much as humanly possible. Here again the throttle must be rolled on, rather than snapped on.

When braking or slowing down in rocks, one must remember to get the weight as far to the rear as possi-



If you're going to ride in rock-filled terrain, a skid plate like this is a must.

HOW TO WIN AT RACING

ble, even more so than when braking in sand, or normal terrain. The rear brake should be applied first, not to the point of lockup, but enough to slow the wheel down, almost to the point of lock-up. Then the front brake must be applied slowly, again going to the point of lock up, but not hitting it. As soon as the proper amount of speed has been scrubbed off, the power must, whenever possible, be rolled on again. Whenever you are riding through rocks, with the power

off, you are at the mercy of any deflection which might accidentally hit the tire.

ONE LAST WORD OF CAUTION. If you are going to ride through rocks, chances are, you are going to fall occasionally on those rocks. When this unfortunate happening comes about, the rider must remember to tuck in and roll into as much of a ball as possible. The only serious injuries occur when an extremity takes the

Small rocks must be treated like sand, except that less traction is available and the bike will offer better throttle response. Rocks sap less power than sand.





Flotation on loose, small rocks is high and the tires build a berm, much like sand.

initial impact with the rocks. The more area that you can have hit the ground, or hit the rocks and make as much contact at one time, the more evenly it will be distributed and the less the chance of serious injury.

The most dangerous rocks are the ones that you cannot see. Most of these will lurk slightly beneath the surfaces in sand and sandwashes. If you suspect you are riding in an area that has rocks slightly underneath the sand or slightly covered, then at all times during your transition through this area, keep the weight totally back as far as possible and keep on the pegs. This way, if you feel a sudden wam-bam impact, the entire machine should lift off the ground and re-

cover nicely on its rear wheel. Failure to assume this position or having this happen while you are sitting in the saddle, can mean that the rear end of the machine will kick up violently into the air, sometimes throwing the rider over the bars, resulting in the famous endo.

If you are descending a hill and the rocks look so fierce and so deadly that you are actually wary of riding down the hill—then don't. Stop the machine, shut the engine off and bulldog the bike down the hill. Try to watch out for rolling rocks, that might roll over, injuring ankles, feet or toes. Just remember, the nicest thing about riding on rocks is having them behind you and not having to go over them again.

SECRETS OF SAND RIDING



Whoop-de-dos at their best (worst?). The faster you can move over these, the smoother the ride will be.

Every year they hold something called the Jackpine Enduro; this well-run event is held somewhere in the middle of Michigan. Other than the fact that this endurance event is one of the toughest, it is also noted for the tremendous variety of terrain covered. A competitor can expect to be faced with everything from deep, muddy bogs, to shale hills to twisting paths between millions

of trees. And just for giggles, somewhere along this devious course layout is a section of nearly bottomless sand.

Here is where the seasoned spectator can immediately tell the Western riders from the Eastern riders. The Eastern boys enter the sand and suddenly all their poise is gone. Feet leave the pegs and straddle along

on the ground while the front tire knifes in and the rider fights the bars.

The exact opposite happens when a seasoned Western rider enters the same section -- this is fun stuff for him. He merely turns the throttle on and skims lightly through the stuff as if it wasn't there. All too soon, the sand is gone, and it's back into the brush and something he can't handle -- trees and mud. Every area of the country has its great equalizers.

Riding in the sand is the worst feeling in the world a first-time rider can have. Everything feels shifty and uneasy and the front wheel is always trying to do something *it* wants to do, not what *you* want it to do.

There are several secrets to successful sand riding that you must know, and the most important among these is:

DON'T FIGHT THE BIKE'S FRONT END -- LET IT DO WHAT IT WANTS TO DO.

This may sound like an open invitation to suicide, but it is the only effective way to ride in the sand. The reasoning behind this may alleviate your fears somewhat -- once a certain amount of speed (depending on the choice of tires and the depth of the sand) has been reached, the front wheel will have a great deal of gyro effect. In other words, the mass of the spinning wheel

generates a very powerful force and this force has a mind of its own.

Example: If the rider is traveling through a sand wash at 40 miles per hour and the front wheel hits a small rock that is concealed by surface sand, the wheel will deflect momentarily, then the gyro action will bring the wheel back in to its previous line, namely, straight ahead.

However, if the rider attempts to fight the bars when the impact of the rock is felt, he may end up over-correcting and losing the machine. As long as the power is kept on, the front end will attempt to correct itself, but trying to force the front end to do something it does not want to do is a direct and positive invitation to an endo.

This does not mean that the rider can just sit there and roll cigarettes while he is riding, but it does mean that he should ride with his arms loose and a firm grip on the bars. The front end will have a "hunting" feel to it, but this is merely an indication that the wheel is seeking the best path while trying to keep on a straight line.

There are occasions when the rider *must* fight the bars. Situations when the obstacle the wheel hits jams the wheel so far out of line that gyro effect cannot bring

When cornering in deep sand, the power must be on hard; in this way the sand will build its own berm.





Trying to corner with power off causes the bike to become very awkward . . .

it back, demand some effort on the part of the rider. An unseen rut can literally yank the bars right out of the riders' hands, depositing him neatly on his ear.

So you have a problem — too tight of a hold on the bar and you do not allow the wheel to seek its own path. Too light and a heavy deflection can dump you. The answer is twofold: Keep a tight grip and relatively loose arms and (most important), get the speed as high as possible. The higher the speed, the greater the gyro effect of the wheel and the more it will ignore variations from the norm.

Simply translated — go like hell and you won't feel anything. However, and this is a big however, make a mistake at these speeds, and it is a big mistake.

You have probably noticed that the go-fast desert aces rarely crash, but when they do, they eat it really heavy. When these high speeds are attained, available

reaction time is reduced directly in proportion to the speed the machine is traveling. In other words, you have less time to see that rock up ahead before you can figure out how to avoid hitting it.

Additionally, the faster the machine is moving across the ground, the more it wants to travel in a straight line. And the harder it is for the machine to change direction. Back to those old laws of physics. An object traveling in a direction wants to remain traveling in that direction and will resist demands made on it to change direction.

You must then compromise your approach to riding. The speed you travel in the sand must be limited only by your ability to see, respond and correct — assuming, of course, your machine is properly set up and (naturally) depending on the severity of the bumps in the sand.

Riding slow in the sand is much more physically

difficult than riding fast. This demonstrates the lack of gyro effect in a slow turning wheel. Even expert riders have a difficult time in deep sand at low speeds.

To get those high speeds, however, you have to get moving, and this is where many riders have trouble. The usual drill is to rev hell out of the engine, dump the clutch and paddle off with your feet, with low gear wound out as far as it will go. One good hint — get into the higher gears as soon as you can. *The sooner the rear wheel hooks up with the sand and quits spinning, the better off you will be.* No one ever gained a lot of momentum while the rear wheel was digging a trench.

Remember, as soon as possible get that machine in second gear and play with the throttle. Once you have the bike in third gear, the rear wheel should be main-

taining good contact with the sand and *floating on top of it, not knifing in.* This is very important. The higher the speed of the machine, the more lightly the wheel will float.

This means two things to you: (1) A more comfortable ride with less skittering and (2) less available traction for turning and braking. It is quite easy to power slide at 60 miles per hour in axle deep sand and nearly impossible to do so at 20 miles per hour.

Turning is best accomplished in deep sand by using the throttle to build the berm as you go. In other words, if you want to change direction at high speeds, lean the machine over and gas it. The more the better.

Try to turn a bike in deep sand with the power off, and chances are very good that you'll highside. Those

... often causing the front end to crab in and dump the rider.





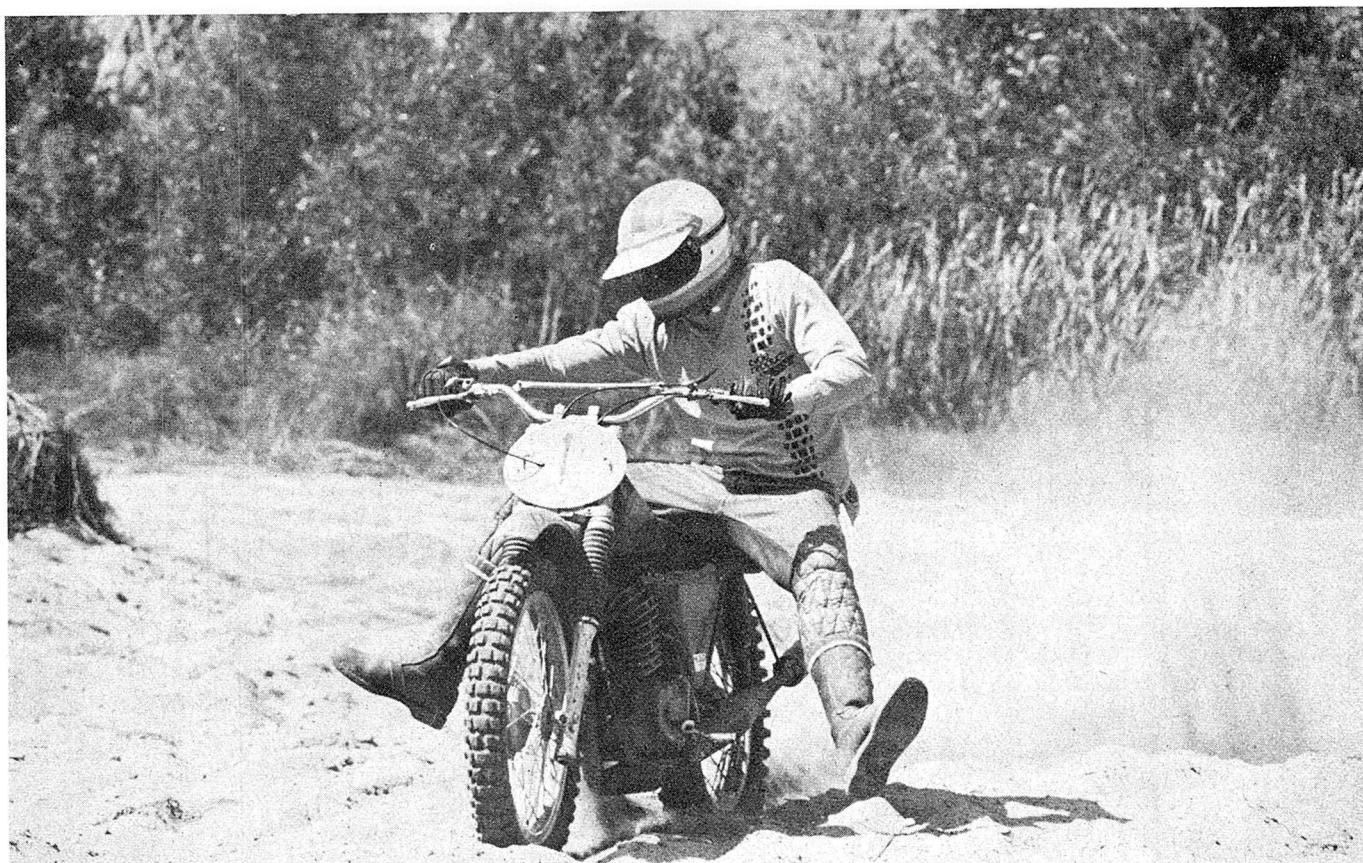
This time, the rider is cornering under full power and full control.

tires want to sink in and bite whenever they can — it's your job to keep them turning and floating. Only power can accomplish this.

You can probably stop in a shorter distance in deep sand than in any surface going, short of a giant bowl of Jell-O. The minute those brakes are hit, a berm starts building up at the leading edge of both wheels. Don't be afraid to use the front brake. As long as that front wheel is straight up and down, you can brake as hard

as you possibly dare. Just be sure that your weight is as far to the rear of the machine as you can manage. The more weight to the rear, the less on that narrower front tire and the less tendency to knife the wheel in. This is one time you should hold those bars a hair tighter.

If you are going to be doing a great deal of riding in the sand, then you might want to go all the way and modify your machine to suit the terrain. Most riders agree that the fatter the front tire, the better. A very



Keep those feet on the pegs and stand up while riding whoopdies, unless you want to be an instant soprano.



When starting in deep sand, push off with both feet, then shift up to the higher gears as soon as possible.



The rider's weight must be slightly to the rear while traveling at high speeds. This keeps the front end light enough to loft over any obstacles. The arms should be loose and relaxed, letting the front end do its own thing.

popular tire in the desert events is the 3.50x19 trials patterned tire. Many prefer the knobby type, but the trials seems to float easier, at the expense of less accuracy while turning.

It's simply a matter of what you want — better flotation or more steering accuracy. If you like a 21-incher more, then go to the fattest 21-incher you can find. You must have at least a 3.00x21 and preferably a 3.25. Recently, a 3.50x21 has been introduced, and this seems to be the best all-around thing since the invention of sex, but is not available in large numbers as of this writing.

For the rear end, a full knobby seems to be the best bet, the bigger the better. Just make sure your engine has the beans to pull it.

Most riders who spend a great deal of time in the desert either buy a generously raked machine or modify theirs to suit the high-speed nature of sand riding. The more straight up and down the forks are, the harder the bike will be to ride in the sand. Kick that same front end out there a tad, and the nature of the beast changes. It's the same as the tire thing; the more raked the front end is, the more the machine wants to travel in a straight line and the less it wants to make directional changes.

Once you are properly set up machine-wise and maintain enough speed, no sand should be a challenge for you. But there are different kinds of sand. Take wet sand — this is some of the neatest stuff to ride on that you will ever find. Traction is unbelievable and the surface has just enough give to it to allow the rider to perform razzle-dazzle tricks he never dreamed of before. The only problem you may encounter will be judging



Once in this position, it is difficult, if not impossible, for the rider to recover. Keep those feet on the pegs.



Do not follow closely behind another rider in deep sand; the bikes simply move around too much.

how much power to apply while changing directions. You will find the bike reacting much quicker than in dry sand, and it is advisable to roll the throttle on, rather than punching it like a good thing.

The exact opposite is silt or talcum powder sand. This stuff feels and reacts just like water, and creates much more drag on the bike than normal sand. One thing you must remember here is that the machine will ride much lower in this "silt" than in normal sand. It is also great fun to fall in. To get hurt in this stuff, you have to work at it.

Take any of these varieties of sand, place them on an off-camber section and the fun starts. Most riders don't realize just how far a bike can be leaned over in this



Never attempt a turn at the base of a whoopie-die; always initiate a turn at the crest or on the level.

situation. A good rule of thumb: If the bars aren't scraping the high side of the hill, then you are not at the limit of lean.

Sand, once these things you have read have been mastered and learned, is a ball to ride. Some additional items that may help you are these simple rules:

- (1) Keep your weight to the rear for maximum traction.
- (2) Use weight shifts and full power to avoid something in front of you.
- (3) Stand up on the pegs when covering rough or choppy sand.
- (4) Just sit down and go like hell in the deep stuff.
- (5) Enjoy.

HOW TO RIDE WATER

Every once in a while, some devious, evil-hearted scoundrel lays out a course through one or more water crossings. Then the fun begins. As the pack converges on the path leading to the water, expressions on the riders' faces change from fierce, to wide-eyed concern. Thoughts run through minds . . . "Ooomahgawd . . . I forgot to waterproof the still air box" and "How deep is that stuff anyway?" and "Should I try to wheelie across or just ride through or what?"

Generally, the pack hits the water crossing and several bikes stall, several more splash down on their front wheel and highside. Ker-splash! Riders splash and nearly drown other riders. Goggles get saturated and few can see further than their front fender. All in all, great fun. Especially for those riders who know how to take water crossings and are long gone, while their competitors wallow and waste time.

Yes, indeed, there is a knack to successfully negotiating water. Much of the knack consists of knowing how to "read" the surface of the water.

As long as the H₂O is moving, it can tell what lurks (or does not lurk) beneath the surface. If the water is clear (which it might be if you're the leader) then you can probably see the bottom. Chances are after a few assorted knobbies have passed through, it will be a tad muddied up.

If you can spot some turbulence or heavy rippling, that indicates a shallow spot. The closer something is to the surface, the more distortion is created in the smooth flowing pattern of the water.

If the water is very still in one spot, with zero rippling, and there are ripples all around the still spot, you can just about bet that is a very deep section. Avoid this.

As long as you must pick a line through the water,





When landing in water from a takeoff ramp, or a ledge, make sure that the rear wheel hits the water first.



This rider landed dead even, with both wheels making contact at the same time. The splash was huge and he got most of it.

consider the size and shape of the ripples. If they're high and clearly defined, chances are that some fairly good-size rocks are causing the action.

If the rippling is gently shaped and fairly low in its pattern, chances are it's just a sand or dirt build-up, or a collection of small rocks. This is the spot you want to pick for crossing, if you have a choice.

If you don't have a choice, try to use the opposite side bank as a guide. If a tire track is visible, that means that *someone* has been through there, and more importantly, made it out. If the surface of the water crossing is uniform and gives no clue, look to the exit side for guidance.

More often than not, you'll be in traffic with a number of other riders around, and even ahead of you. Watch the ones directly in front, and hang back a bit to learn from their experience. Not only can you use them as a guide, but you won't get splashed by following too close.

If you have a number of lines to choose from, and riders are in front of you, watch which ones make the

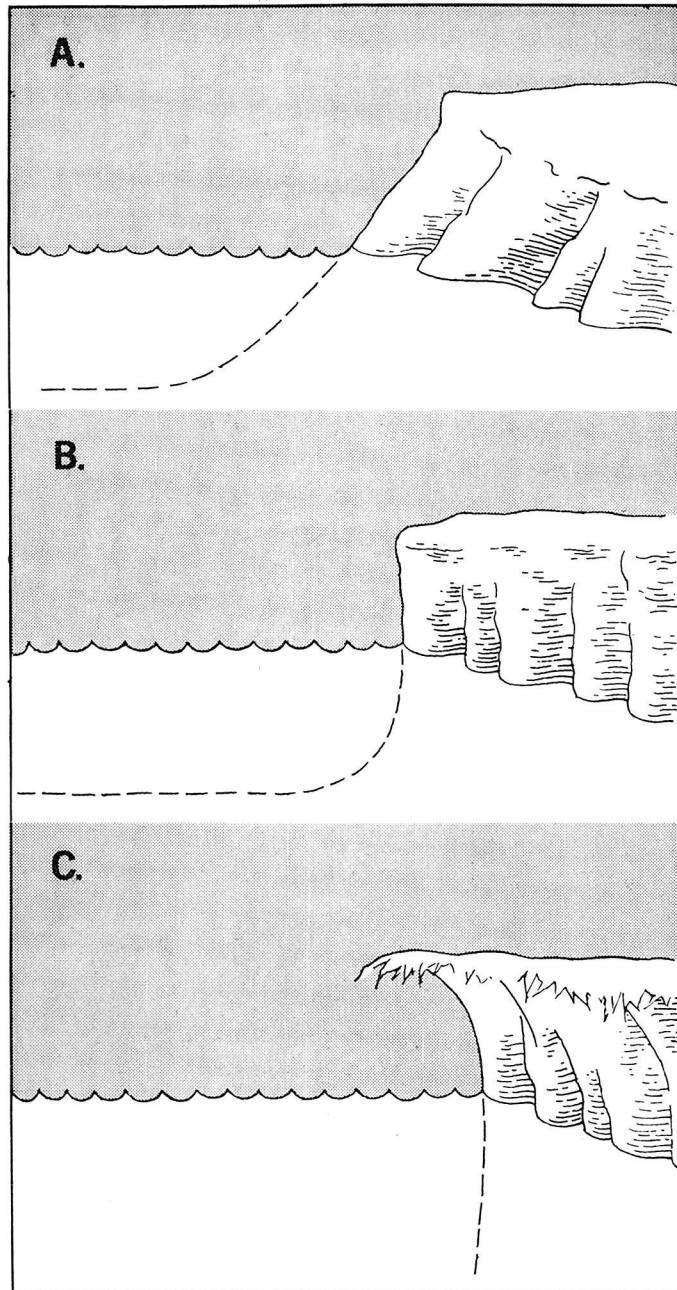
smallest splash. This will tell you where the water is deep or shallow. Big splash — deep water, small splash — shallow water.

Whenever possible, try to go through the water on the rear wheel. This should keep most of the splash behind and under you. However, if you attempt this in water that is too deep (footpeg height) chances are high that your feet may be violently pulled off the pegs by the pressure of the passing water.

A good rule of thumb is to attempt to wheelie across the water hazard if the water is axle height or less. Any deeper than that, and you might get physically pulled from the machine.

If you attempt to wheelie through water, remember that the water is exerting a powerful force on the rear wheel of the machine — so keep that throttle on hard. Back off the smallest bit, and the front end will be dragged back down into the water.

Don't ever attempt a wheelie, unless you can do it *all the way across* the water hazard. A front wheel com-



ing down in water is not the easiest thing to control — especially if it makes contact with something under the surface.

If the water hazard has a ridge that must be climbed on the opposite side, it is best to keep the front wheel in the water until right before the ledge, then lift it up and climb out. The logic behind this is relatively simple: If the front wheel should drop from a wheelie into the ledge, the machine will come to an abrupt halt, but you won't.

An unmarked opposite bank can give you some clues, even if not one tire exit mark is visible. Figure A shows a bank shape that would more or less indicate a normal slope under the water. This would be the one to attempt an exit on.

Figure B would be more of an unknown, but should still be possible. The bank is vertical, which indicates that the current is fairly swift because the water has washed away any gradual slope.

Figure C, by the undercut shape, shows that the

water is indeed swift and steep, and probably is very deep at that spot. Not only that, but the protruding lip is a natural-born wheel stopper.

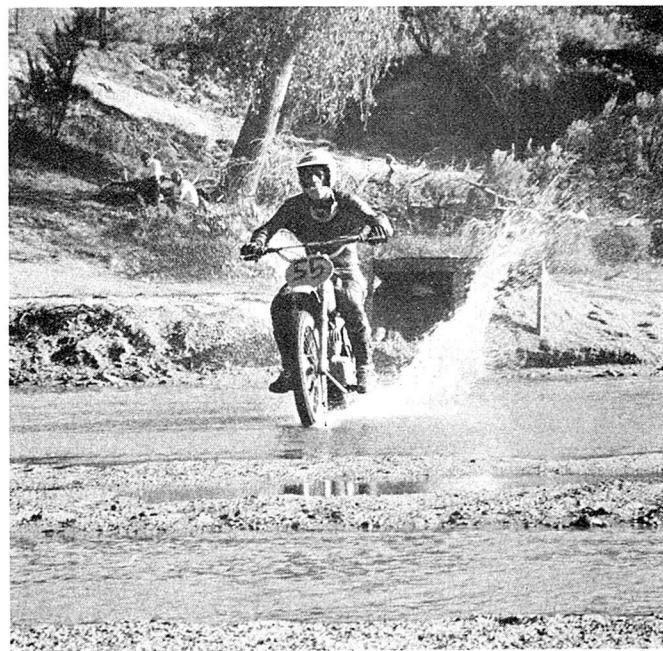
The surface material of the banks gives you an indication of available traction. Wet, glistening sand has a high water content and will suck a wheel up so quickly you won't know what happened. Especially if it's smooth. If the sand is dry in patches and has irregularities, chances are it has some body to it and has at least decent traction.

Large wet rocks are murder, but a number of smaller ones offer good traction, even if they are wet. Wet or moss-covered logs are tough to get over. They seem to delight in laying on the banks at water hazards. Avoid them if you can, but if you can't, approach them at a perpendicular angle. If you are even the smallest bit off the head on approach, the tires will slip off easily. Here the traction is near zero.

Mud offers better traction than most riders would think. The secret is to use a higher gear than normal and torque through. Avoid too much wheel spin. Blasting through mud in low gear will often cause the rear tire to lose flotation and sink in up to the hub. One of the most pleasant things in the world is *not* wrestling a bike out of knee-deep mud. Keep the bike rolling and don't back off that throttle. Momentum will usually carry you through anything.

If you are really in doubt as to your ability to make a treacherous mud/water crossing, shift up one gear, gas it and go like hell. Make sure you're up on the pegs for balance and, more often than not, you'll be through before you know what happened. The slower you're going, the more chance the tires will have to sink into the mire.

When crossing a wide water hazard, speed is also the way to go. The same water crossing that will splash the engine at 25 mph will blast out a swath of water 20



Same jump, but this rider landed rear wheel first, then the front end came down. Note the difference in the size of the splash, even though both flew about the same distance before making contact with the water.



Perfect water crossing technique—the rider keeps the front wheel up . . .

feet on either side of the bike at 50 mph. And very little will touch you. Just keep your eye out for the rider who might try the same trick while right next to you. That displaced water has to go somewhere — and it might be on your goggles.

If you see you are about to get splashed, and can't get out of the way, at least try to keep the stuff off of your goggles. You are quite helpless when you can't see. If you're wearing a visor, tuck your head down and let it take the brunt of the splash. If you don't have a visor, turn your head momentarily, and let the back of your helmet get the dousing. Not only will this keep the vision clear, but cold water down the back of your neck has a way of waking you right up.

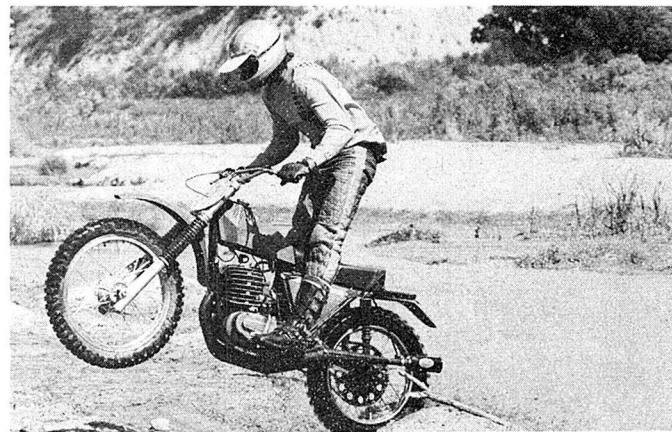
If you must race across a stream with a very heavy current, don't try to fight the flow. Enter the water and ride with the flow. This will let you keep your speed up and make the exit much easier. Trying to ride directly across, or against the current, is a real horsepower robber. Plus the splash is much greater riding against the flow, rather than riding with it. And you want to keep the splashing to a minimum. It's bad enough getting splashed by a competitor, but if you splash yourself, you really hate it.

Quite often, the entry into a water hazard requires that the rider drop off a ledge, or leap into the water. If this is the case, get that front end into the air, and land rear wheel first. A front wheel landing can rip the bars right out of your hands — and you can never tell what is under that water.

When you land from a ledge, keep that throttle on. This will keep the front end up as long as possible.



. . . and clears the small bank at the opposite side without getting his feet wet . . .

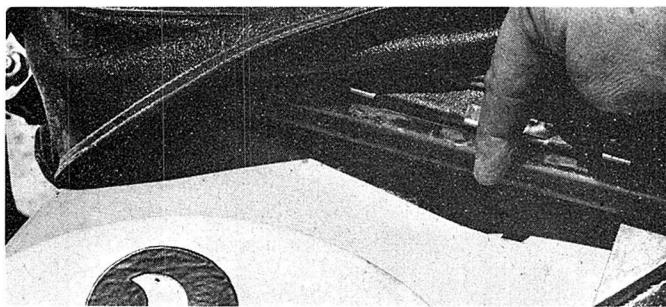


. . . then rolls on the power for a clean, smooth exit.

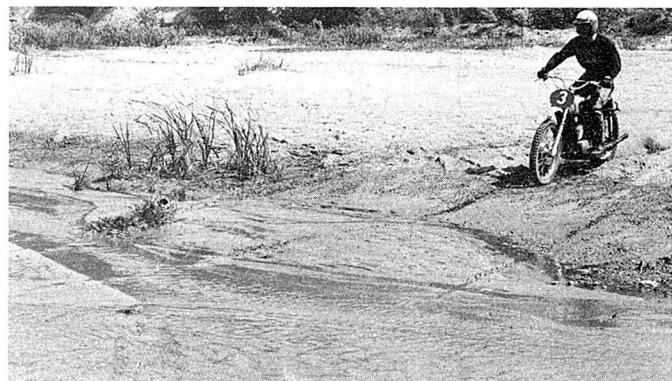
Failure to do this will cause two things. Firstly, the front end will slam into the water, and secondly, the rear wheel might dig a small trench into the bottom of the hazard. If the power is on when you land, you should roll out of that trench easily.

If the water hazard has a bunch of debris in it (legs, rocks, branches) you are money ahead if you take it easy and just get over the stuff enduro fashion. Go over all rocks at the fattest part if you cannot avoid them. A wet rock offers little traction on the slanting edges or sides. Try not to go between two or more rocks that form a "V" (Figure D), as they have a way of trapping a tire, or moving out of the way and causing a sudden lurch. Rocks in water are not exactly solidly anchored, and move quite easily.

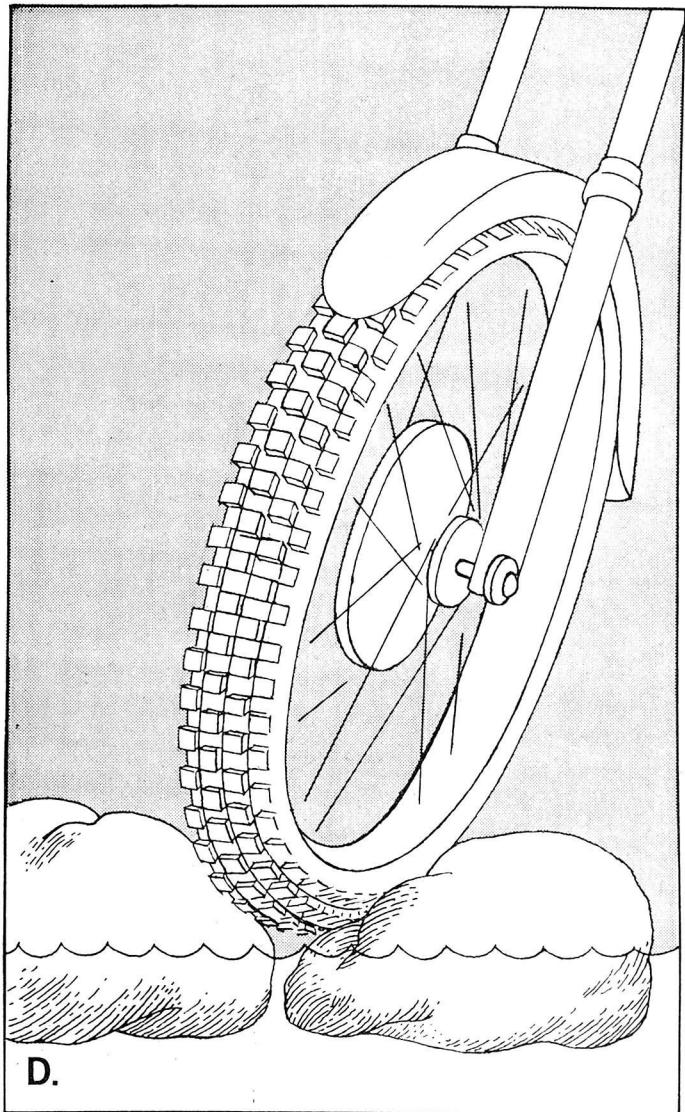
If you happen to stall the bike in a water hazard,



Even a well-designed still box, such as this one on a CZ, could use extra duct tape for maximum water protection. In this case, a section of tape from the frame to the side of the box would be ideal, and still leave room for breathing at the rear of the seat.



Tire tracks on the bank can be read like "Indian signs," telling the rider what to expect in the way of traction.



D.

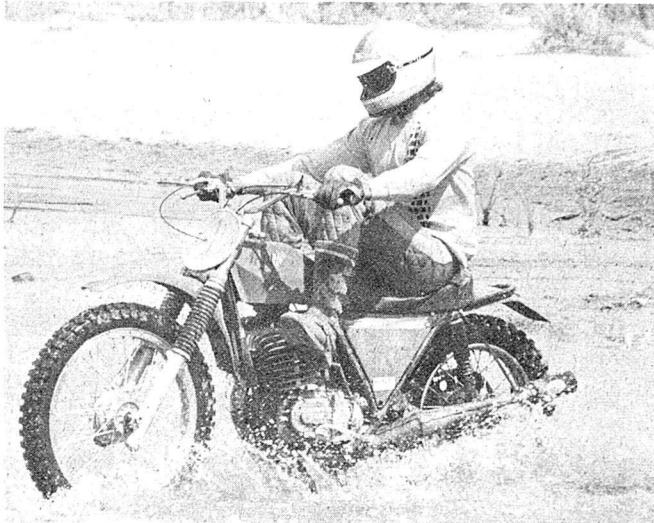
don't just sit there like a dummy. Get out of the way — pull the bike off to one side, then attempt to start it and get out of there. More often than not, you will not be able to hop on the machine and move it from a dead

start. It is much safer to start the bike, put the machine in gear and walk alongside it, playing the clutch as needed. It is very easy to bury the rear wheel by spinning the tire too much, so use discretion and gentle application of throttle on the way out, especially when climbing any banks.

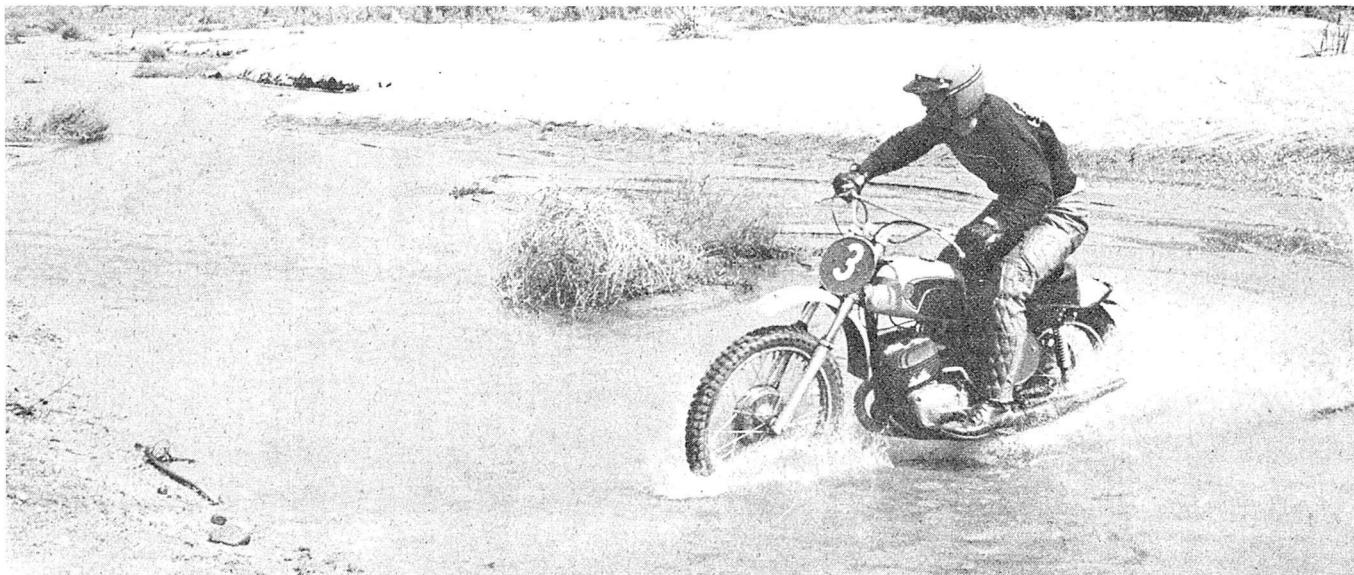
If you do take water into your engine, it is Big Trouble Time. Savvy riders push the bike out of the way, remove the plug, turn the machine upside down, and turn the engine over by spinning the rear wheel with the bike in gear. This will usually get most of the water out. Or at least enough to allow you to start the bike and blow the rest of the particles out. Oh yes, turn the bike back over to the upright position before attempting to start it.

Good waterproofing is essential for both the still air box and the electrics. There are several good ignition sprays on the market, and liberal use of duct tape can seal off most air boxes without too much sweat. If you don't take the time to do safeguard work, you just might spend the day taking impromptu showers from the guys passing you up.

Wrong way to cross a stream. If the rider were to hit something under the surface, he would be unable to make a correctional weight shift.



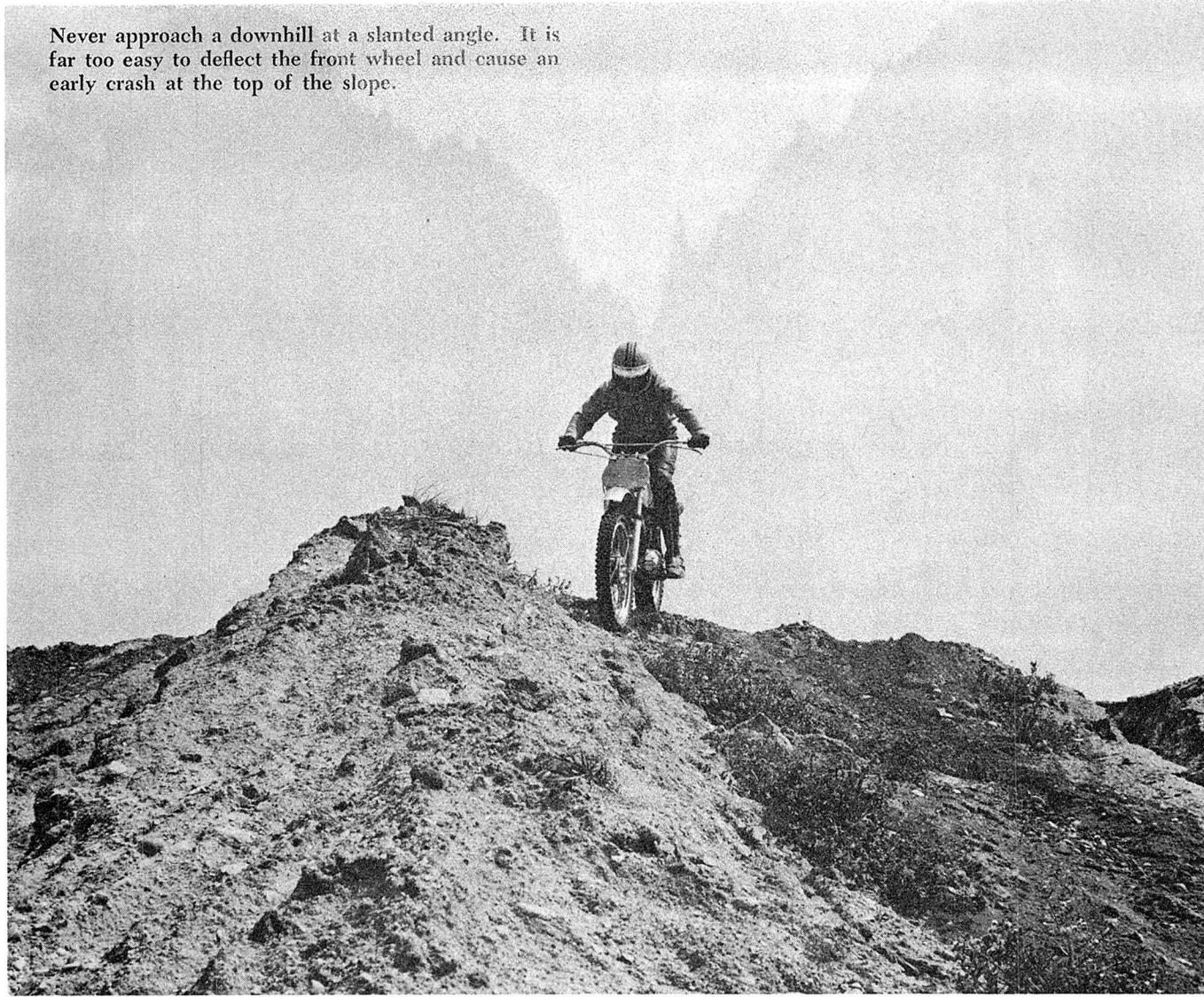
The right way—up on the pegs ready for anything.



MASTERING DOWNHILLS

The Common Weak Link

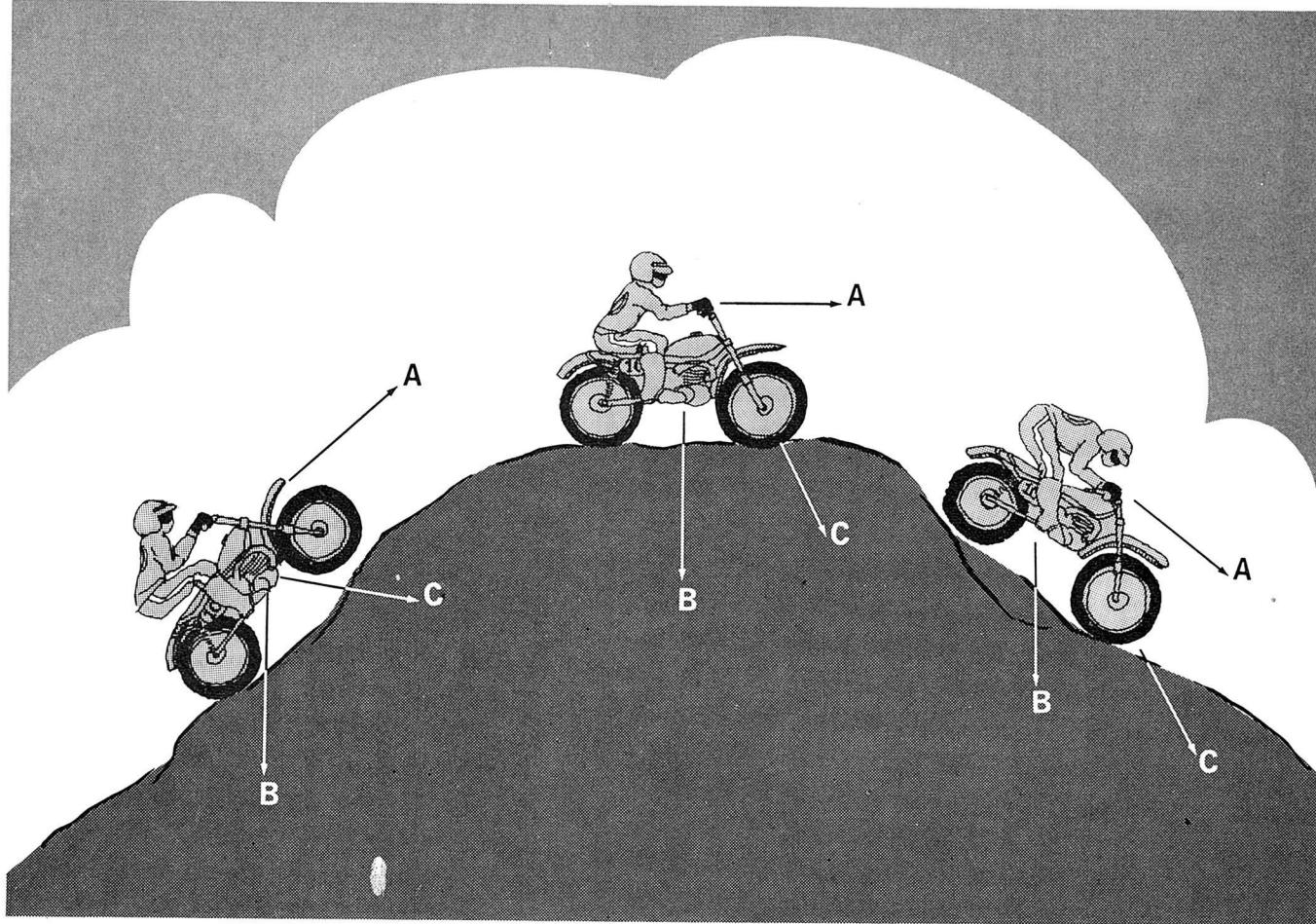
Never approach a downhill at a slanted angle. It is far too easy to deflect the front wheel and cause an early crash at the top of the slope.



You probably had it happen to you when you just started to ride. There you were, inching down what seemed an impossible hill — and somebody came down past you, gassing it on and even picking up gears. It seemed fantastic that the other rider could take such a chance, but actually *you* were probably coming closer

to crashing than *he* was — all because of some basic facts that *he* knew . . . and *you* didn't.

Stop and consider why downhills hang up otherwise good riders. We even went so far as to conduct a sort of impersonal poll among dirt riders of all levels of proficiency. They all agreed they had crashed more going



downhill than they ever had going up or riding on level ground. The longer they had been riding, the less they crashed, but the average dirt riders looked at downhills as the thing they feared the most.

When a rider understands why this is so, then he can take action to overcome the problem.

The problem usually started with the beginning stages of trail riding, when the rider found himself in the middle of a downhill, going faster than felt comfortable. The rider grabbed the front brake, and the locked front wheel skidded, sending him over the bars, right on his gourd.

About the third time this happened, the rider learned not to lock the front wheel brake. But by that time, he had probably built up a fear of the descent that stays with him permanently — unless he can work himself out of it.

For this reason, mastery of the art of going downhill involves reprogramming your mind to accept this fact: 90 percent of the downhill crashes are caused by either improper braking, or by going so slow that your machine unloads you when it cannot skim a deep surface rut or bump.

TO GET AN IDEA why this is so, take a look at the diagram in this chapter. Three riders are shown — one going uphill, another on the level and a third going downhill. Notice the three arrows labeled A, B, and C. There's no need to go into a bunch of vector analyses: A represents the forward motion of the bike and B represents the pull of gravity. When you move forward

on the machine, the forward motion A and the pull of gravity B combine to make a common direction of force C.

The faster you go uphill, the more the arrow C moves toward A, and the easier it is to make the hill. The faster you go downhill, the more the combination C moves toward A and the harder it is to stop.

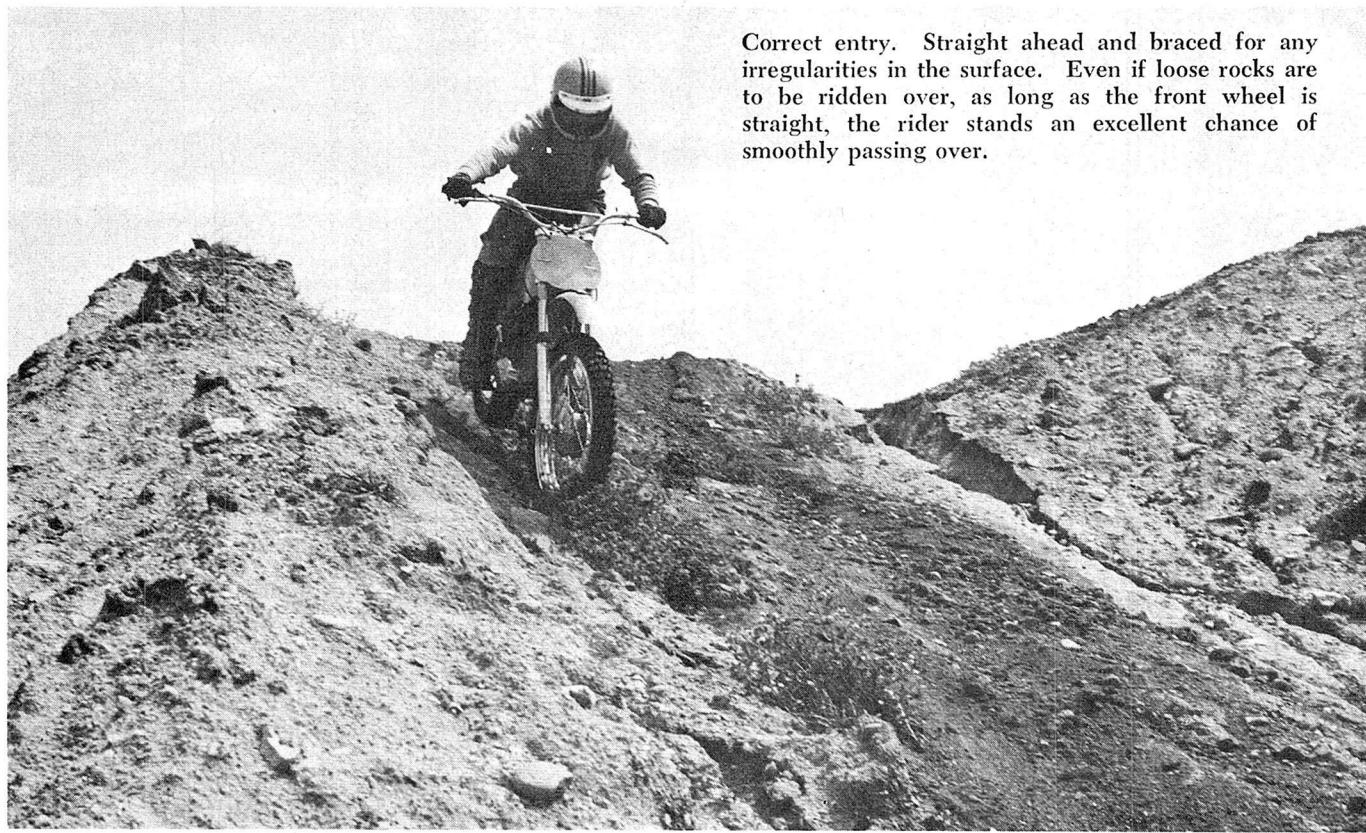
To give you the full picture, the rider on the level will have nothing but the force of gravity B pulling on him when he stops the bike, as neither A nor C do anything when the bike is stopped on the level. This is why nothing moves anywhere when it is set on level ground.

Now you can see why it is so hard to stop on a downhill slope. There is a positive side to this which the top riders put to use. Because there is little gravity pulling back or down on you as you descend the hill, your bike will skim over the same bumps downhill that would jar your teeth out going uphill. The faster you go, the smoother the hill becomes. If you get the picture we have presented above, you can now say that you know "where it's at."

Here are a few simple rules that apply to any downhill — fast or slow.

1. NEVER COMPLETELY LOCK UP EITHER WHEEL OF YOUR MACHINE.

If you doubt this, try putting your bike in first gear and then heading down a steep hill with the clutch pulled and the rear wheel locked (it locks easier than you think). When the rear wheel is sliding, get off the



brake and disengage the clutch. You will notice that your braking power increases instantly when the rear wheel can turn over.

The number of otherwise top riders who should know this — but don't — boggles the mind. A clear example of this was seen at the '71 Trans-AMA Motocross at Boise, Idaho, where the world's best had to contend with a 450-foot downhill as steep as sand can stand. Many of the top Europeans locked the rear wheel, and when this happens on a loose slope, the rear wheel be-

Correct entry. Straight ahead and braced for any irregularities in the surface. Even if loose rocks are to be ridden over, as long as the front wheel is straight, the rider stands an excellent chance of smoothly passing over.



Downhill rain ruts are real wheel grabbers. Avoid them if you can. If you must cross them while descending, make the angle as sharp to the running line as you can and apply gentle power to get the front wheel rolling over, rather than slipping in.

gins to hop from side to side. These riders indulged in an over-the-bars endo.

By contrast, Sylvain Geboers would sail into the downhill and brake lightly with the clutch pulled, never locking the wheel. When he was about a third of the way down, he would engage the clutch, using short bursts of power to straighten out the machine.

This is a hard thing for the average rider to do, but remember — whenever you need power to pull out of trouble on the level, you will need power to pull you out of trouble going downhill.

Because the rear wheel locks so easily, we recommend the technique quoted to us by Sammy Miller of leaving the bike in gear going downhill. This way you can listen to the engine and tell when you are about to lock the rear wheel as rpm drops.

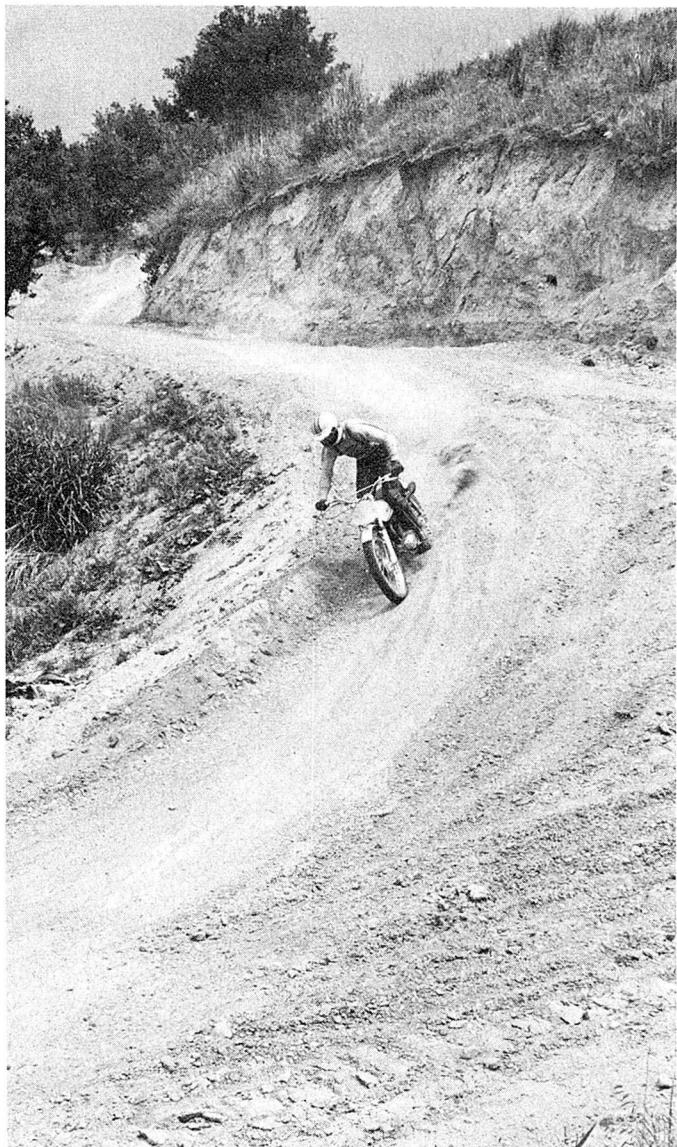
All riders do not agree on this, including, in part, Sylvain Geboers. What we are saying is, using the Miller technique, you can learn to never kill the engine or lock the rear wheel, either of which can spoil a good downhill run. Try Miller's way — you'll like it once you learn to use it.

The taboo against locking your wheels going downhill leads us to the next general rule.

2. NEVER USE THE FRONT WHEEL BRAKE WHEN MAKING A DOWNSHILL TURN.

As long as you are going in a straight line, you can use as much front brake as you wish — as long as you can still handle the machine. Never use the brake when you must make a quick turn. This has caused more trouble for novice riders than anything else. Avoid this great crash maker by releasing the front binder when you make the turn, then use it again when you are straightened out.

It follows that you can use a small amount of brake



If there is a smooth run at the hill, pretend it does not exist and blast away. Remember, a hill is nothing more than a straightaway that's tilted.

on a small turn, but watch some beginning hillclimbers coming down sometime. This is the one thing that sends most of them into a helmet test.

3. ALWAYS KEEP YOUR WEIGHT AS FAR AS POSSIBLE TOWARD THE REAR OF THE MACHINE.

This goes hand in hand with the front wheel brake usage mentioned above. Remember how, in the accompanying diagram, the rider going downhill has most of the combined pull nearly straight ahead of him as he descends the hill. This means that there is very little weight on the rear wheel of the machine, and this is why it locks so easily when you use normal braking pressure.

Keep your weight back, and you will help the rear wheel hold. The same rearward weight shift will help keep the front forks from compressing.

Notice that the bike in the diagram has, in effect, no rake left in the forks when he goes down the hill. If you ride a machine with telescopic forks, you can see that the shift of weight forward is going to smash the forks down to the point where there is the same

effect as a negative rake. This makes the bike want to oversteer and throw you into an endo.

This is the greatest justification of the leading link style front forks, such as DKW's. The DKW is set up so that application of the front brake *picks up* the front of the machine rather than *compressing down*, as with the telescopic style. This style of fork really comes into its own on these rough downhill sections.

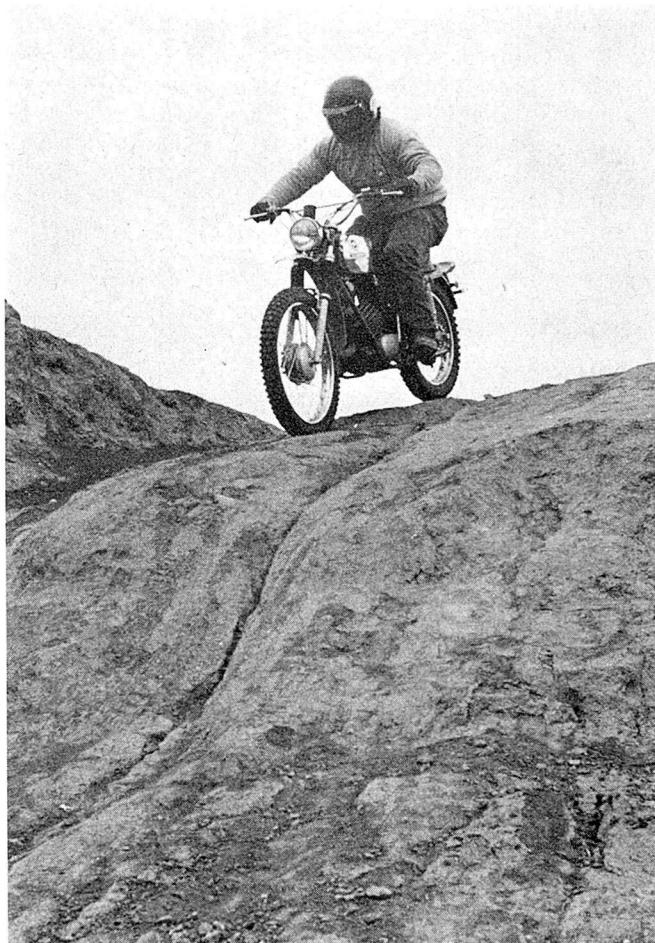
You will find that it is almost impossible to properly keep your weight held to the rear when you have your feet off the pegs. This means that the farther you slide forward onto the tank, the closer you are to busting your bod. Use your feet only when all else fails.

Here we will add a subheading no-no, because it causes violent crashes occasionally:

NEVER DO A BIG WHEELIE-STYLE JUMP ONTO A DOWNWARD SLOPE.

We mention, in passing, that you need never have your front wheel higher than 20 degrees more than the slope you are landing on. We have seen some super bad smashups in which the rider has jumped off onto a downhill with the front wheel of the machine high in the air. If he lands with the rear wheel braked, the front of the machine can slam down so hard from the high position onto the low slope, that he gets a high-speed endo, with the scooter right in the middle of the back.

If you land with the power on, you can probably let



When going down a short, steep dropoff, brake before the grade with both brakes . . .

the front end down slowly and survive, but you never see the pro motocrossers do this stunt. If it looks like they are, notice that they are landing on the level, not a steep slope.

Now that we have the principles well in mind, let's go down a few hills. All the rules previously mentioned apply; how you will use them is governed by the hill.

THE FAST DOWNHILL

Many riders are interested in taking a downhill super fast during some form of competition such as motocross, desert or cross-country races. In all these situations, you will be following some sort of a course which should be free of hidden hazards.

Whether a downhill can be blasted or not depends mainly on what is at the bottom of it. If the bottom of the hill has a relatively smooth straight run to slow down in, the hill can be blasted.

You can have the most fun you ever had by taking your 125cc machine and blowing off the 400s and 650s on this sort of hill. The size of the bike makes no difference on the downhill —except that the heavier it is, the harder it is to control.

As long as you know that a hill has a straight and fairly smooth run-out area at the bottom, you can gas it on and pick up gears. The faster you go, the more effortlessly the machine will skim the bumps.

If the hill has a winding trail or path (as found in enduro situations), pace the descent by how fast the



... then ease down with the front brake off and slight braking on the rear wheel. Do not lock the rear wheel up.



Never drag your feet on a downhill—it won't slow the bike down and takes away your ability to use body balance.

corners can be taken. We usually blow off a half a dozen riders at a time on these narrow winding downhills because too many riders take these sections much too slowly.

Remember, the slower you descend through rough ground, the rougher your bike rides. A little speed — say, 15 mph — smoothes out the ground for the better rider, and just as long as he can make the curves, he will be long gone.

THE SLOW DOWNHILL

It is a great experience to blast down a rough hill, but what if there is a square corner in the middle or at the bottom? This is why we say, look the hill over before you try to blast it. The rules for all downhill situations apply on either fast or slow hills, but consider the short, near-vertical drop-off. Knowing how to manage them will put you a half-mile ahead of the uninformed competition.

For example, a rider has to come off a rock ledge and go directly into a 90-degree righthand turn at the bottom. If the bottom run were straight, he could jump this at 50 mph. Since to do so would be suicide in this case,



The right way—feet on the pegs and the weight set back. Keep the wheels turning and never lock up completely.

the rider must first reduce his speed to almost zero just as the bike drops over the ledge, because there is no way to slow the machine once it is committed.

The front forks should be 80 percent compressed, even though no front wheel brake is being used, and the rider's weight must be transferred to the rear as far as possible. Copy this technique and you will be able to come off these "impossible-looking" ledges.

The most important thing here is, weight all the way to the rear, and NO front wheel brake when the wheel hits the bottom. If our hypothetical rider locked up the front wheel now, the forks would bottom and the farm will have been sold.

Notice, too, that in this situation the front forks are in a negative rake position, due to the steepness of the hill, and the unavoidable fork compression, due to weight transfer. This illustrates why the front wheel brake throws you when you try to turn with it on.

IN A NUTSHELL, you can make the combination of forward motion and gravity work for you by following the rules we have outlined above. The only real obstacle you have left to overcome is in your mind. The average rider will never want to descend a hill faster than he feels he can stop on that hill.

You will never get anywhere until you realize that there is probably no way you can gracefully stop on a fast, rough downhill, so forget it. Ignore the fact that it is a downhill, and ride at the top speed at which you can make the curves. As long as you have a straight runout at the bottom, turn it loose and forget about completely stopping until you get down on the level, where gravity will let you stop easily.



If the grade is absolutely too steep to ride down, stop the bike by laying it down on its side—and shut the engine off.



Place the bike at a right angle to the hill and keep it from slipping by cramping on the front brake.



... then waggle the front wheel, pumping the front brake on and off and walk the machine down. Keep the rear end higher than the front and "squiggle" down the hill. It's not the fastest way, but sometimes you have no choice.

Till now, we have been talking about riding the bike. If you get into a situation where you feel there is no way you can ride down the hill, try the bulldogging technique. Here, you kill the engine at the top, with the transmission in first gear. Get off the machine and lock the tank of the machine under your right arm. Grab the hand brake from the front; the dead engine acts as a rear brake that you can control with the clutch. Put both feet wide apart and skid down with feet near the front axle.

If you are already committed on a bad hill, and see an obstacle that you must stop for, the only way you are going to do this is to lay the machine down. Lock the rear wheel and make a slight turn, and the bike will broadslide. Drop the bike and get hands and legs out from under. Stay low and flat, and you will stop before the sliding bike does.

Remember, bulldogging a bike down a hill is a last resort *only*. Ride whenever you can — and don't panic. It's surprising how many situations a rider can get out of it he stays with the machine. However, most of those panic situations can be avoided if you follow the hints and tips you have just read.



Place your weight on the seat or the tank and get both feet on the low side of the bike . . .

CUTTING UPHILLS DOWN TO SIZE



Hoo Hah! For the first time in your life you got a good start off the line and you're well up in the pack. Things are great up among the leaders. No bad dust to eat, and you can really get it on.

Then, looming up ahead like a misplaced giant iceberg, you see it: THE HILL! *Oh, no — not a hill. I can't climb hills THAT big!* you say to yourself.

Right then and there, most riders would decide to give it one helluva try anyway, and hit the base of the hill flat-out in low gear. This will generally take them part way up the hill nicely — and then the rear wheel will dig a neat 10-foot trench in the ground.

The bike usually stops dead in its tracks then, and the rest of the pack will go right past the hapless non-hillclimber.

Sound familiar? If you're like most riders, those big uphills will cause you some grief, but they are not really insurmountable.

There are different techniques for different hills. Which technique to use will depend largely on what type of motorcycle you ride. The rider who has a torquey 360 enduro-type machine must use a totally different riding style than the fellow who rides one of the peaky, ultra-hot 125s.

When all of the various possibilities have been sorted out, there are three basic techniques used by men who get over the top:

First, the "controlled wheelspin" method used by pro hill climbers, such as the AMA Class A competition specialists.



Controlled hillclimbing is a combination of throttle and weight distribution. Jim Connolly is climbing a more or less normal grade, keeping his weight slightly back for maximum traction.

Second, the "controlled throttle" technique, used by riders in observed trials.

Third, what might be called the "Dirt Bike" technique, which incorporates the best parts of the first two and applies them to the average cycle.

WHAT MAKES A HILLCLIMBING BIKE

Let's consider the Class A machines for a moment and see what makes them work. They use the utmost in one phase of hillclimbing: power and controlled wheelspin.

Here Jim compensates for the front end rising off the ground by getting his body weight well forward to keep the machine from looping. The throttle is still on to keep the engine from bogging down.

There is nothing yet that can climb hills higher or faster than Class A machines set up for that specific purpose. This is because they use engines of up to 80 *cubic inches* and burn exotic fuels, using tire chains on the rear kicker to get the maximum traction effect.

There are two things to be learned here that apply to all hillclimbing: One is that if you can keep up enough speed, you can climb anything. The second is that the Class A machines use no transmission but run in one gear only; riders control the wheelspin to keep





As long as the front end does not get too high, it's all right to keep it in the air a bit . . .



. . . however, once you get to this point, you better start thinking about a little weight transfer.

their revs up. They often hold full throttle and use a kill button to control the engine.

These types of hillclimbing machines use looping chains on the rear wheels to which the rider adds or subtracts links to keep the rear wheel spinning at just the right amount. This technique is good for straight-shot runs only, and will work best for pipey machines.

The other end of the spectrum is where you will find the observed trials type of machine as a good example of the controlled throttle technique. This machine, which is usually a 20-hp 250cc, can get up all the hills that require twisting and winding paths.

In this technique, the rider concentrates on keeping wheelspin to an absolute minimum to maintain the vital speed to conquer the hill. Where the Class A bike's technique is comparable to the fuel dragster's one tremendous blast of full-on power, the trials bike depends on a wide, tractable power band, so the engine can pull

strongly at any rpm. With both machines, you must maintain speed and momentum to make any hill. They both use traction as the key to this speed, but horsepower differential and engine characteristics mean they have to use opposite methods to make use of the traction.

If the Class A machine rider loaded his rear tire chain with too many links on a sticky hill, it would be impossible to keep it from looping as a result of too much traction. The trials bike rider, on the other hand, can allow for no wheelspin and must try to maintain 100 percent traction, as he has no herculean power to get up a big run with.

The third, or "Dirt Bike," technique takes the lessons learned from the above and applies them to the average competition machine, or enduro bike.

HOW IT'S DONE

OK, let's load up the iron and head out for Desert Hill.

Old Desert Hill is a 300-foot-high gentleman, with loose powdery dust on his chin, a 2-foot-high rock ledge for a nose and a sage-brush crew cut. A few ruts cut through the stubble beard of brush and football-size loose stones.

First, stop and look for a good Class A-type groove. If we can get a big enough run at the hill, we could throw the engine away and coast over the top.

There is a good groove, and since one bike is a screaming hot 125 and the other is a very tractable 360 enduro, we charge the hill in the same way, with the best run at it we can get, along the smoothest course.

Too many riders rumble up to the base of such a hill all wrung out in first but with no real momentum.

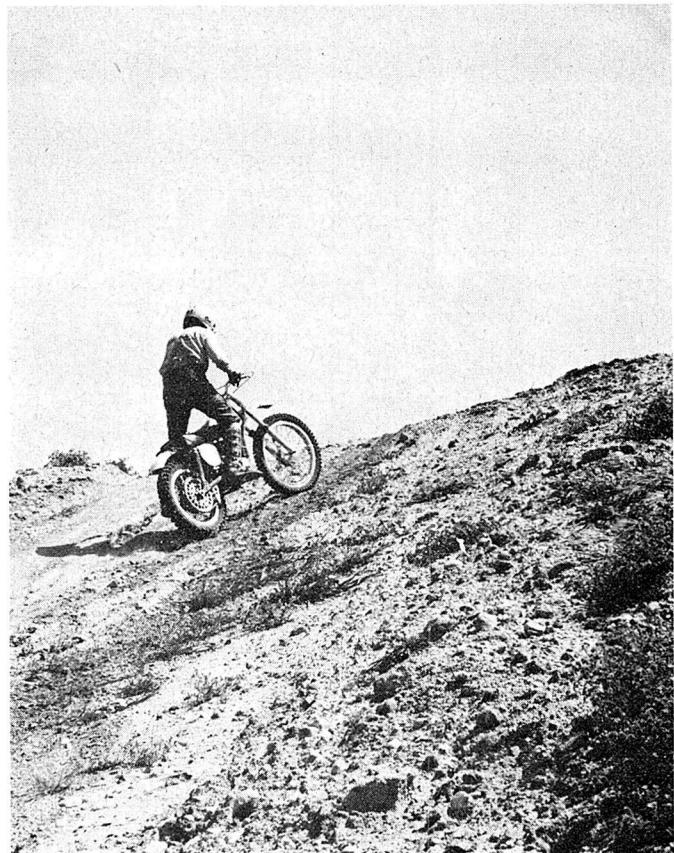
If you are on the 125, you must stay up on the power band, so approach the bottom in the highest gear near the power peak. The minute you hear the engine start falling off, shift down.

On the 360, you have a bunch of ponies hidden in the basement, so you might approach the hill in mid-range because you have a lot of power band to play with. Blast the loose dirt at the bottom, because there is no traction to be had. The 125 has gone from fourth to third, and the 360 is loping along still in second.

On either bike, you want to be on the pegs slightly, hauling back on the bars and blip the throttle to kill it. This takes practice particularly on the hot 125, as you have little power band to play with.

Now you hit a patch of hard clay on the upper lip of the hill; this is why you have to be on the pegs. The bikes try to loop over backwards, so you back off the throttle and throw your weight forward to keep the front end down.

The wrong side to get off the machine, the low side puts all of the machine's weight on you, and is nearly impossible to hold, unless you're King Kong.



Don't be afraid to climb any hill, once you learn how to properly lay the bike down and turn it around. Follow Jim on an aborted hill climb attempt and apply it to the next hill that conquers you.



The right way: Get on the high, or control, side and lay the bike down as gently as you can to prevent damage. Use the front brake to stop the machine from flopping.

HOW TO WIN AT RACING

On the 125, you may have to transfer weight and let the wheel spin, or you are going to fall off the power band and have to shift. Shifts are often a must, but they cause you forward momentum as they are made and invite a missed shift which usually blows the climb.

The sense of timing and judgment on how much spin you can allow and how far the revs can drop will be determined by practice on your particular bike — and nothing can take the place of it.

Here comes the ledge. Ledges are the sort of an obstacle that spoil the climb for most riders. If you ride into it straight on, you will buck the front end straight into the air and loop, or you'll get so badly out of shape that you wobble off into a stall. The timid will get stuck with either the front or the rear wheel against the ledge.

The way to get over is to pull back on the bars just as the front wheel is about to touch. Loft the front

wheel over and as soon as the front wheel clears, shift your weight smoothly forward, because the rear wheel is going to kick when it hits the ledge.

On the 360, chop the throttle, then roll it on again as soon as the rear wheel gets a new bite. Too much beans and you can get a big bite of traction and loop.

On the torrid 125, rpm must be kept at all costs, so keep your weight forward and let the wheel spin, trying to keep momentum by cautiously shifting the weight to the rear, with your foot near the shift lever.

Half the time, the ledge will have cost you a gear's worth of momentum, so be prepared. If you get out of the intended groove, pick as smooth a path as possible to the top and forget the groove. Avoid anything that tends to make the cycle buck. Every time the rear wheel leaves the ground, you lose that important forward speed.

You are almost to the top now, and the surface has



Once you have the machine stabilized, start rolling it backwards, using the front brake gently. If the engine is still running, shut it off . . .



. . . and roll the bike to a right angle to the incline of the hill.



Then, slowly right the bike, while still keeping it from rolling with the front brake.

turned hard again. The 360 is down in first and over. The problem is that the 125 is also in first and you need first minus one, because you hear the old revs dying under you and you are at the bottom of the deck.

Only 40 feet to go, so throw your weight out over the bars and take a look at your headlight. This will break the rear wheel loose and keep you from stalling out. It is a matter of keeping enough forward motion to clear the top, so just keep it moving that last few feet and you'll make it.

KEEP FEET ON PEGS

Here is something to try that will also serve as a review of the above technique. Watch a few riders trying to make a tough hill. If you want to impress your buddies with the fact you know what you are talking about, watch the riders who put their feet down halfway up and bet they don't make the hill. With the exception of

the guy who paddles the last few feet over the top, you will be right.

If you put your feet down in the middle of a tough hill, you blew it, because the weight is now on the ground rather than on the rear wheel where it can buy you some traction. With the feet off the pegs, you will find it impossible to carry out the delicate weight shifts we used to climb old Desert Hill.

If you can climb a tough hill with your feet on the ground, it means that we are talking about different hills, not *tough hills*.

What would a rule be if there were no exceptions? In some events, you may get caught way back in the pack and have to climb a badly rutted hill full of powder dust. If you get trapped in one of these deep ruts, you may have to paddle to make it. If so, keep your full weight on the seat as much as possible, only pushing with the feet to purposely break traction to keep the



Swing your leg over with the front wheel cocked into the hill . . .



. . . then, reverse the front wheel angle and plant the outside foot on the peg.

revs up or to maintain forward motion. Touch the ground *only as a last resort*.

While we are discussing competition events, let's cover the situation in which you come up an old Desert Hill and you've got it psyched out completely — only to find that 28 "dumb-dumbs" have stuck their bikes all over the only possible grooves.

If you have the torrid 125, you are going to have to sit there and wait until one clears so you can get a proper run at it. If, on the other hand, you have tuned the same 125 so that it has a wide usable power band, you can thread your way through and go over the top, as you will be able to play around with the throttle to keep traction.



Release the front brake while putting your weight on the pegs. Make sure the front brake is off at this stage.

SAND HILL TECHNIQUES

What about sand hills? The same applies, only in a much more subtle form. Let's take a situation in which the sand is, for all intents and purposes, bottomless. Here, speed is of the essence, as you can get some flotation from high speed. The important thing here is that once the wheel starts to spin, you have sold the farm; you must roll off the throttle when you hear it taking place.

If you have almost reached the top, you can do as Sammy Miller has done on some occasions — bounce your weight up and down on the rear wheel to get that last bit of traction. Generally speaking, try to wheelie up a loose sandy hill, keeping max power. Sand robs



Once you're straightened out, release both brakes to get the machine rolling . . .

power like nothing else, so try and keep the front wheel out of it. Chances of looping are slim, as traction is too poor.

Let's run over the ideas here just to make sure we haven't missed anything. Where you are facing a straight-on hill with a good groove, try hitting it with maximum speed. Keep the wick full on. On any hot bike, you have to burn the hill using wheel spin control and what little latitude you have with the throttle. This is the way to make the big ones, keeping that delicate balance between wheel spin and looping.

When you are facing a hill with no straight shot or groove, you are going to have to ignore the impulse to burn it; you won't make it. Here you have to rely on throttle control to weave your way between the natural and unnatural obstacles.

The secret is in sensitive and delicate throttle control. Too much speed will throw you into one of the obstacles, and you will get out of shape and break traction.

In summary, winning the hillclimbing game depends on your ability to shift your weight and your knowledge of how to use *all* of your throttle, not just full-out. ☺



. . . then blithely ride down the hill like you had planned the whole thing and try again. This time, with a little more throttle, and more forward weight.

JUMPING TO SAVE TIME- THE PROFESSIONAL WAY



Too much enthusiasm with the right hand can lead you to the point of no return. Photo by Richard Creed.

The taller a gear the rider chooses, the easier it is for throttle control. Great handfuls of throttle are not the answer in going over a jump. Too much can cause the rider to loop. No power at all will cause a rider to land on his front wheel. A little bit of power is the answer, and the proper way to take the jump.

As a rider approaches the jump properly lined up and in the proper gear, with enough throttle left to take him over the jump properly with the right amount of momentum, he should get up on the pegs and get his body weight slightly back, knees tucked into the tank. As the rider leaves the crest, he should have slight power on. The minute the machine becomes airborne, the rider should roll back the throttle. As he sails through the air, the bike may deviate in direction. Here is where body shifts are of utmost importance. If the front end of the motorcycle starts coming up too



Here, Larry Watkins tugs at the bars to get the front end higher. Also note the rearward body position.

Jumping the motorcycle, even though it looks dangerous and exciting, is probably the easiest of the motorcycling skills to learn. The entire key to jumping successfully is a proper approach and a proper rider attitude during the flight.

Let's take a typical jump, and tell you how you should approach it. Assume the straightaway allows the rider to reach a speed of 60 mph. At the end of the straight is a jump with a natural sloping ramp, dropping away a few feet and continuing straight, before the rider must turn.

The most important thing the rider must do is to approach the jump as straight as possible. Approaching the jump with the motorcycle slightly cocked, or crooked, is almost a sure spill. As the rider approaches the jump, he should make sure that he has some power left in reserve. In other words, if you approach the jump completely wound out in third gear, the chances are very good that you are going to land on your front wheel and possibly crash. A rider should, then, always approach a jump with enough power reserve to be on acceleration as he is leaving the crest. It is actually much safer to shift up a gear and lose a few miles an hour before the jump in order to have some power on hand.



Same jump. This time Larry uses body english to straighten the attitude of the bike before landing.



Easiest jumps are the uphillers, landing on level ground. Only caution—not too much throttle. These are the easiest on your suspension.

high, the rider should shift his body weight forward. Sometimes riders may have to go as far forward as having the handlebars nearly against their chest.

If the opposite happens, that is, the front end of the machine is level or in a nose-down position, the rider must get his weight very far to the rear and possibly use a slight tug on the bars. Discretion here is a must. Too big a tug on the bars, or too much of a shift backwards, can result in the bike looping over backwards, causing a severe crash. If by some chance the cycle should start to twist sideways in the air, because of one reason or another, the rider must take advantage of body weight shifts to straighten the machine out. If the bike lands cocked, the rider could be in serious trouble.

As the machine is about ready to touch down, the power should be rolled on again. If the power is rolled on too abruptly or violently, the chances are the machine will stand straight up on end and possibly loop over backwards. If no power is applied, the impact from landing is very severe and can cause the front end to dive into the ground and slam down, rather than gently float down. The key here is to apply enough power to make the transition from air to ground, with still some forward drive to let the front end gently touch down. Some riders, in their haste to slow down for a corner after their jump, slam their brakes in the



Here Jim Connolly demonstrates the correct bike attitude for a downhill jump with plenty of run-out room at the bottom.



Here Jim has the front end too high for safety and will have to ease off the gas to bring it down. This, of course, will cost time.

air or slam their brakes upon impact. This can cause the front end to come down so violently that it may toss them over the bars. This is an absolute no-no. Do not—repeat, do not—ever touch the brakes while the cycle is up in the air.

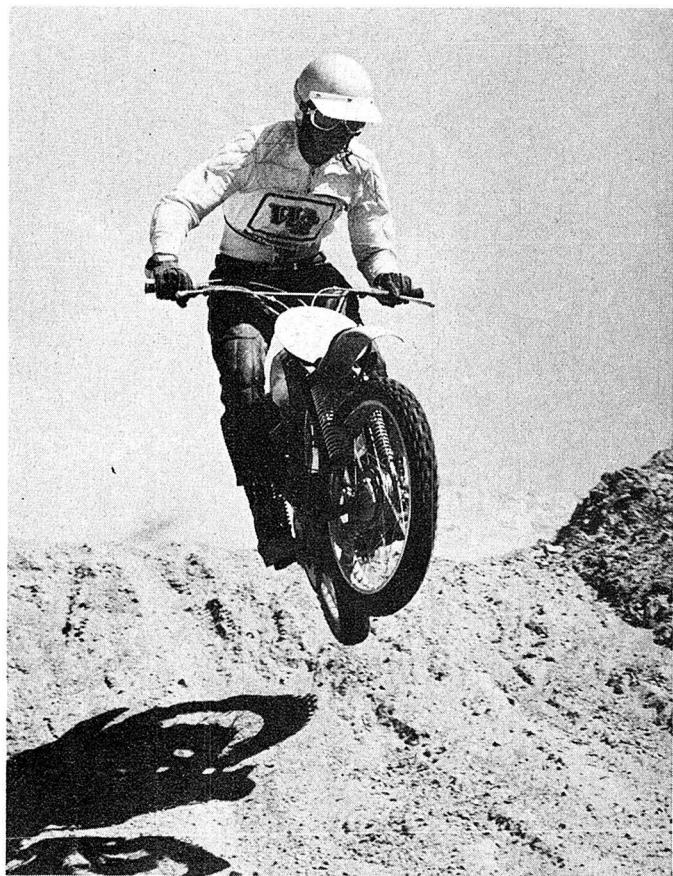
Some of the more skilled, or possibly more daring, riders have been known to shift gears down while they are in the air for a corner that might be located closely after a jump. Even though this is a timesaving maneuver, it places a tremendous strain upon the drivetrain on a motorcycle and can actually rip off hubs and shear chains. John De Soto is noted for this, and he is not known for being easy on motorcycles. However, John is noted for being very fast.

If the machine lands slightly crooked, the rider should have a bit more throttle than if the machine were landing straight. This extra throttle will help straighten out a motorcycle, but an effective body weight shift must accompany its use. Failure to do this will cause the bike to attempt to change the direction upon impact, if the mass of the weight of the rider and the vehicle are not in line. This could cause the bike to highside the rider violently.

While jumps on the level are relatively easy, downhill jumps and uphill jumps are a horse of another color. The most frightening jumps, of course, are the downhillers. Every inch in the rider's body tells him that he should shut off as he is approaching a downhill jump. To do this on a downhill jump is almost a positive guarantee to landing on the front wheel, and on a downhill jump, even more weight will be transferred to the front end than on level ground. As long as the rider has room at the end of the jump on a downhill,



Same downhill jump, this time showing how not to do it. If Jim would land with his front wheel cocked like this, he would almost surely crash.



Never leave the jump with the machine off the straight line. A correction must be made in the air for this rider.



As soon as the rear wheel makes contact, get that front end down—with weight over the bars, if necessary.

there is no reason he can't accelerate as hard as on level ground. Allowing, of course, room to stop and turn if the situation demands.

Uphill jumps, however, are much easier than they look. The only precaution a rider must take is to keep from looping the cycle over backwards. This is most easy to do. A rider cannot go too far forward when approaching an uphill jump. It is a good idea to keep your eyeball right on that good old fender by leaning over the handlebars. Less throttle should be applied when landing on an uphill jump than when landing on a level jump or landing on a downhill jump, simply because the very attitude of the cycle and the angle of the ground will place much greater load on the rear half of the motorcycle, making the front end overly light.

Everyone likes to see those pictures of the hotshoes flying through the air in a crossed-up jump. By and large, these are merely time-wasting showy displays, best left to the rider who is out in front with a huge lead and who likes to be a crowd pleaser for the moment. There are conditions, however, where turning while jumping is possible, and even desirable. Quite often you may find a jump placed in a turn. A very skillful rider can take advantage of this by setting up the machine in the air. More often than not, however, the rider can probably make good time by keeping the wheels on the ground and taking the jump in a straightforward manner, then negotiating the turn.

One thing must be pointed out. The more time a rider spends in the air, the more time he is wasting. An airborne wheel cannot propel or drive the cycle forward. That wheel is just spinning in the air. The most efficient riders get that motorcycle back on the

ground and get that rear wheel driving as soon as possible. Therefore, keep the jump as low and as flat as possible. These razzle-dazzle, high-arching, through-the-air jumps cost the rider valuable time. That wheel must be on the ground to do any good.

A rider is actually better off easing over the jump a little lighter than he would like—and getting the wheel back on the ground driving—than in the great hairy leaps we have all grown to love so dearly.

Whenever there is more than one line going over a jump, always take the lowest line, the flattest line and the smoothest line. There are exceptions to this rule. If a rider has to make a right-hander immediately after landing down from the jump, he may take the higher line of the available lines on the jump, just for the purpose of being set up at a better approach to the corner. This again is something that varies from jump to jump and turn to turn.

If the jump is slippery or muddy, or if the rider must land in very slippery terrain, more often than not he would be better off keeping the rear wheel on the ground and lofting the front wheel the least amount necessary. Maximum ground contact should be maintained to prevent the rider from slipping and sliding. It is far too easy to get the cycle slightly off the vertical while airborne.

If a series of jumps face the rider, he should not attempt to go across more than one without getting the front wheel back on the ground. A rhythm must be developed as follows: Jump, gas on as the rear wheel touches the ground. When the front end is down, accelerate, jump and repeat.

Quite often some motocross courses have what are



Whenever possible, pick the best line from a jump. Here, Tom Rapp should be more to the right, to give a better approach on the upcoming left-hander.



Always keep both feet on the pegs, no matter how small the jump is. That foot isn't going to do you any good dangling out in the air.

known as blind jumps. A blind jump is one where the rider cannot see where he will land as he approaches the jump. In a situation like this, the rider stands a possibility of landing on a fallen or downed rider. In a situation such as this, sometimes it is wise to use an approach other than the normal line that everyone else is using. It will only cost you a particle of a second to use a secondary line and may also prevent you from crashing. If a turn follows a blind jump, always take the outside line. This will leave you room for evasive tactics, if a downed rider is there.

When leaving the ramp on a jump with one or more riders alongside you, it is best to keep your distance. There is no accounting for the other man's actions. He may bobble and his handlebars may catch yours, causing you to go down, even though you are in perfect control. Jumps may vary, even though they are all on level ground. They range from a normal jump, which is nothing more than a bump on a level surface, to a fall-away jump, which is a level surface with the ground dropping away—to a jump that lands on an upper level. Of these three, the drop-away jump is the easiest to take. Dropping away to another level, the rider merely has to maintain his normal approach speed and the cycle will generally assume the proper attitude through the air. Of course, the other rules must be followed, such as gentle power on when landing.

The jump to an upper level must be treated with some discretion, as the possibility of looping is strong. This is the easiest type of jump on the rider's suspension and the landings are usually the softest. On this type of jump the front end tends to stand in the air longer than on other types. Allow for this.

One word on off-camber jumps. Don't. The possibility of spilling is too great on an off-camber surface. Off-camber riding is done most efficiently with the rear wheel constantly in contact with the ground and the front wheel tracking. Obviously, getting airborne causes the machine to lose contact with the ground. Just bear in mind, any machine that loses contact with the ground must make it again sometime, possibly with the rider underneath it.

In summation, make your jumps as short as possible. Spend as little time in the air as possible and get that rear wheel back on the ground, driving the machine forward again. There is not too much traction to be had from a knobby wildly spinning in the air. *



When the front end is too near the vertical line, get your weight as far forward as you can. If you can't see the front fender, then you're not really forward.

PASSING-

How, When And Where

To Make Your Move



Unless you are one of those lightning starters like Tim Hart or John De Soto, chances are you're going to have to pass riders to move up to the front of the pack. And even the best riders are sometimes stuck at the middle or back of the pack. This means passing fellow riders, one of the most dangerous and most difficult things to do in racing.

One paramount rule must be borne in mind whenever passing: Always pass as quickly and cleanly as possible. The more time spent alongside another rider, the greater the chance of crashing or being forced off the course.

The greatest danger in passing other riders is an erratic rider, or as they are known in the game, squirrels. Squirrels never take the natural line. They wander at

random all over the course, without any warning as to a change of direction. These riders will go from side to side down a straight for no apparent reason. On corners, they just sort of wallow around. Avoid these people like the plague.

The best place to pass a squirrel is when he is committed to a line that he cannot move out of. A good example would be if the squirrel is high on a berm, and you can pass low and on the inside.

Generally, the force required to get him on the berm will keep him there for a short while. However, if he is going exceptionally slow up on the berm, watch for any sign of his drifting down into your line.

If you decide to pass this type of rider on a straight-

away, stay far off to one side; allow for a secondary line if his bike starts to move over in your path. If you do not have enough power to pass on the straight, hold your line (at a safe distance) and brake later than usual at the approaching corner.

PASSING IN HEAVY TRAFFIC is a thing all riders will have to cope with at one time or another. Sometimes the heavy traffic can work to your advantage. Riders tend to play follow the leader, especially where natural grooves have been locked in.

When five or six riders are all right on each other's tails, in single file, high on a berm, this is the time to go low and inside. It might be the slower route around if the track was clear, but only the first few men on that berm are going full speed. Of necessity, the following

Here is a perfect illustration of the high and the low line. Even though the inside line (lower line) is faster, the rider is going high because there is a short straight following and his exit speed will be higher.

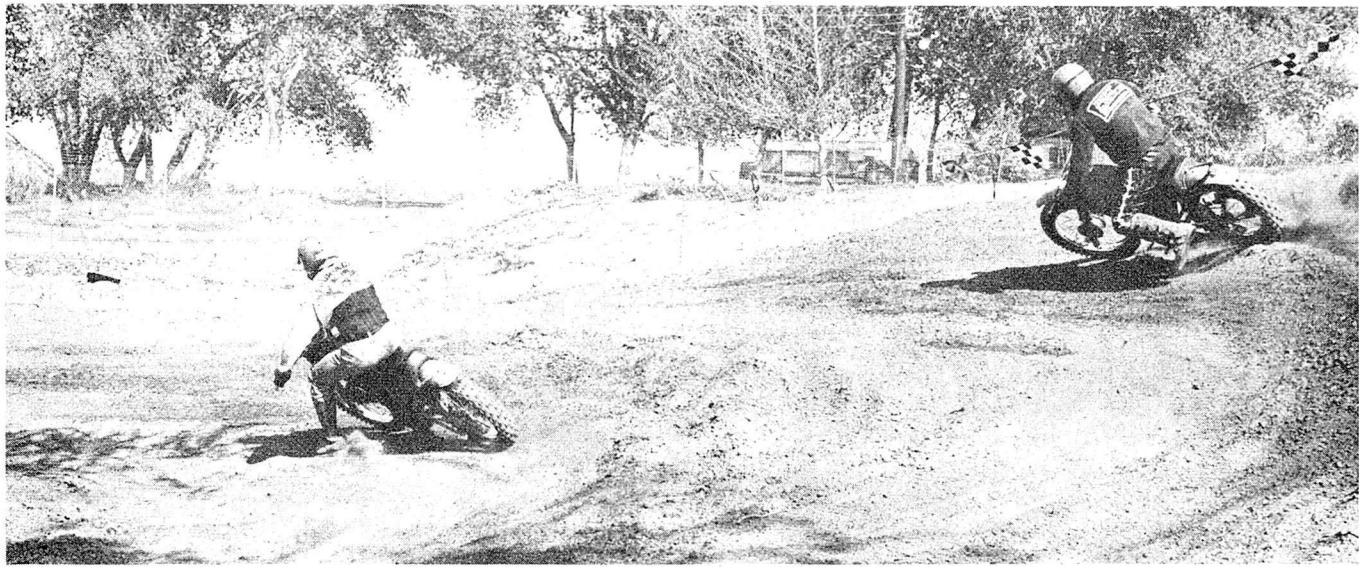
riders are going slower than the man in front. You might not pass the lead man on the berm, but more often than not, you will pick off the other riders locked in that groove behind him.

One thing for sure: you will not pass anyone if you are tail man on the groove.

One good trick many riders use to pass is to stuff the front end in someone's lap. If the rider you are trying to pass is as fast as you are, poke that old wheel right in there next to him where he can see it. Many riders panic when a bike is right next to them; they shut off and let you by.

One word on stuffing the wheel: if the bikes make contact, the man whose wheel is slightly to the rear is generally the man who will go down. Never — repeat *never* — allow your front wheel to make contact with





He uses the berm and starts the drive. Remember, his exit speed must be greater than the other rider's to make up for the extra ground he is covering.

another rider's rear wheel. This is one of the surest ways to bite the dust.

If you pass a rider, don't worry about him hitting you and putting you down. As long as your bike is in front, his front wheel will make the initial contact, and *he* will go down.

When two riders approach the same corner side by side, the man who has that front tire just a few inches in front is the man who owns the corner.

This brings us to braking late, the most effective method of passing. If you are going to attempt to out-brake the competitor, it's best to do it on the outside

of a corner. This way, if you overcook it, you are not going to run into the man. The worst you are then faced with is recovering from a lay down or riding off the course.

PASSING ON THE INSIDE is best accomplished if the other rider goes too fast and too wide, and you can brake short and square off the corner. This is especially effective with a torquey machine. If you are riding a peaky bike, the rpm might drop past the point of quick response, demanding a shift or two down and nullifying the square-off.

The rider at the left is nearly through the turn, but his actual speed is slower because of the shorter, slightly slower inside line. The distance between them shortens . . .



past a rider close to you. It's a little scary at first but, with increased practice, your confidence will build.

Much passing can be accomplished on the first turn after the start of a race. The pack tends to jam and crowd the inside line of the turn.

If you don't get a good start and are not among the front runners heading for the first turn, then consider the outside. If you get a poor start, then the outside is the only place to be. Most crashes are on the crowded inside turn, and a smart rider can squirt by on the outside, passing a cluster of competitors in the process.

If, when passing a number of riders at one time on a section, you must crowd a side, always crowd the clutch side, not the brake side. Poking the front brake lever in someone's back or bike is a sure way to lock up the front wheel — and over you go. If you hit the clutch lever, it's generally no big thing. The engine will rev and you will lose forward drive, getting you out of a potentially bad situation.

TAKE ADVANTAGE OF FASTER riders to pass slower riders. If someone storms by you (an obviously faster rider), hang on his tail as long as possible. If he passes a slower rider and you are right on his rear tire, you are, effectively, one unit — and the slower rider is not about to attempt to break you loose. It's sorta like a freight train; you just keep on rollin'.

Many racers use a rotten little trick called slamming the door. To slam the door, you must block the other rider's intended line by placing your machine in his path. This is a dangerous move that should be made only if the other rider has time to back off. A good rule of thumb is one bike length's distance. This at least gives the other rider a chance to keep upright. Slamming the door on a rider and causing him to fall is not looked upon with favor, and sometimes causes hard feelings.

Some riders will purposely try to keep you from passing by moving their machines constantly in your passing line. This is most unsportsmanlike, but it happens. This is the kind of a guy who will eventually get the gate slammed on him — justly.

Same corner, but rider No. 107 is positioned incorrectly in the corner, creating a passing line for rider No. 201. Three more feet to the right in bike position and No. 107 could have fully protected himself from being passed.

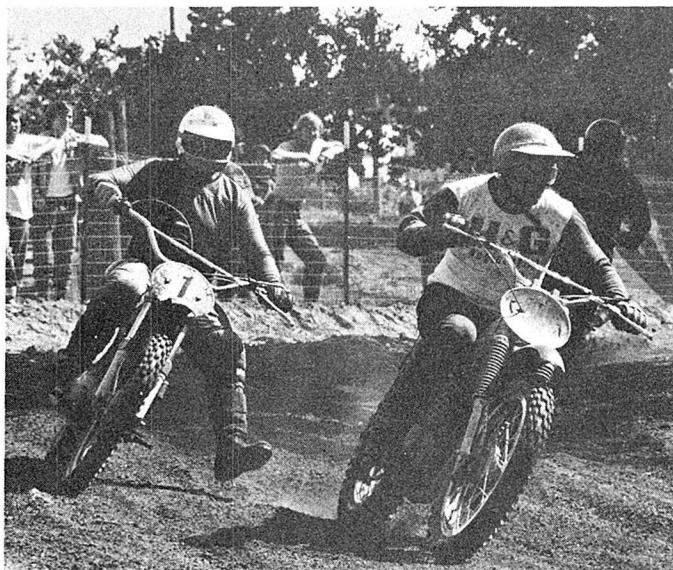


... and the rider is able to pass on the outside, using his greater exit speed. If, however, there had been a turn immediately after the one illustrated, he would have surely lost time taking the high line. A good rule, then, is to use the high line only when you can take advantage of the greater exit speed.

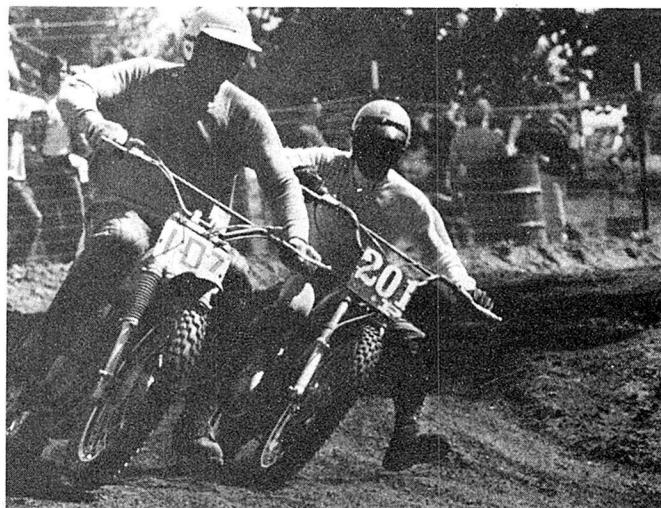
One good way to tell if you should try to outbrake a rider is to see if he uses the front brake or not. If he is a rear-brake-only rider, then it should be no sweat to do the trick. A rider using both brakes can stop in one-third the distance of a rider using only the rear brake.

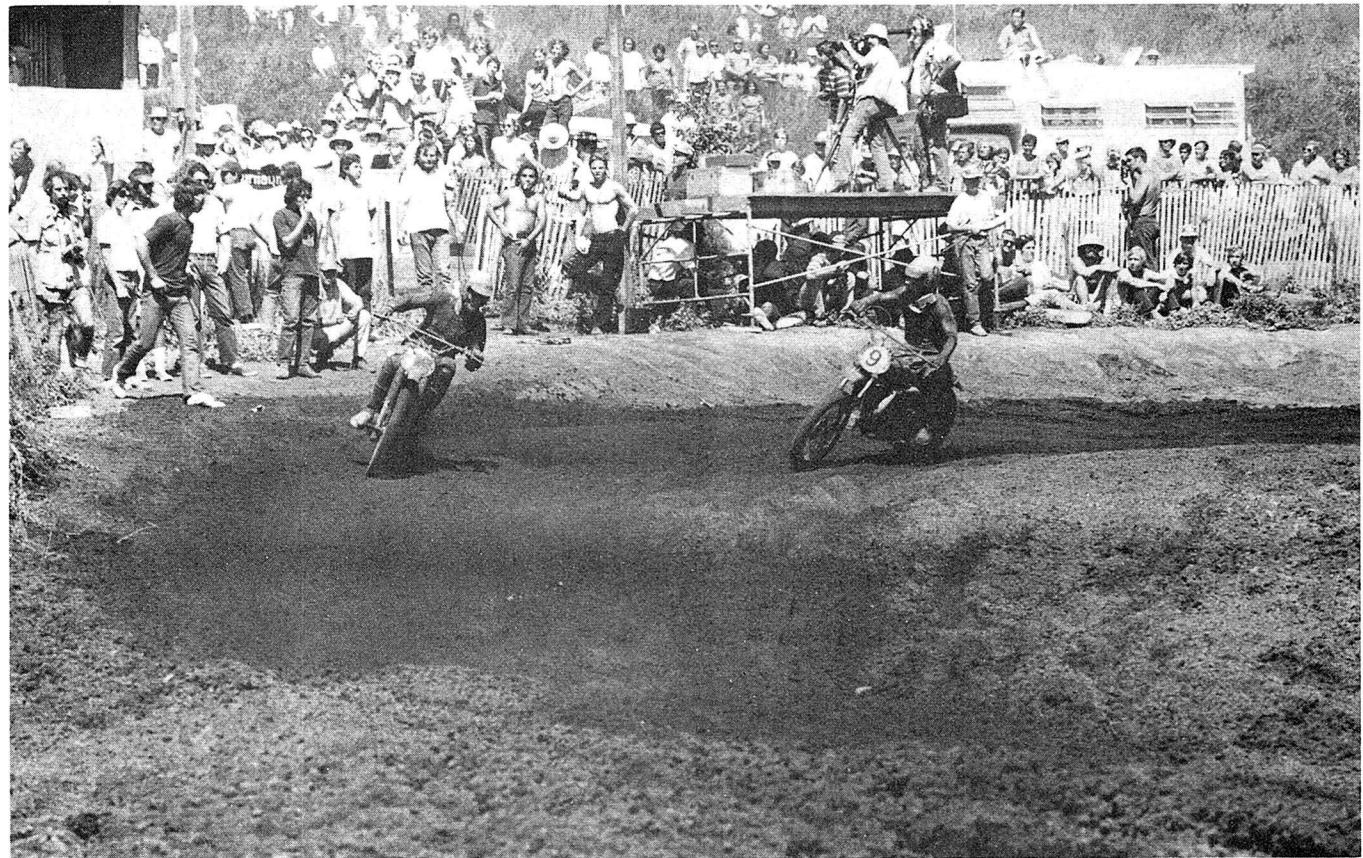
Another excellent place to pass is on the long downhill sections. Here, most riders are overly cautious and go much slower than they could be going. Just remember, downhills are nothing more than level ground placed on a slant.

All a rider must do is allow for earlier braking than on a corresponding section of level ground. One little spurt on the throttle on a downhill will generally take you

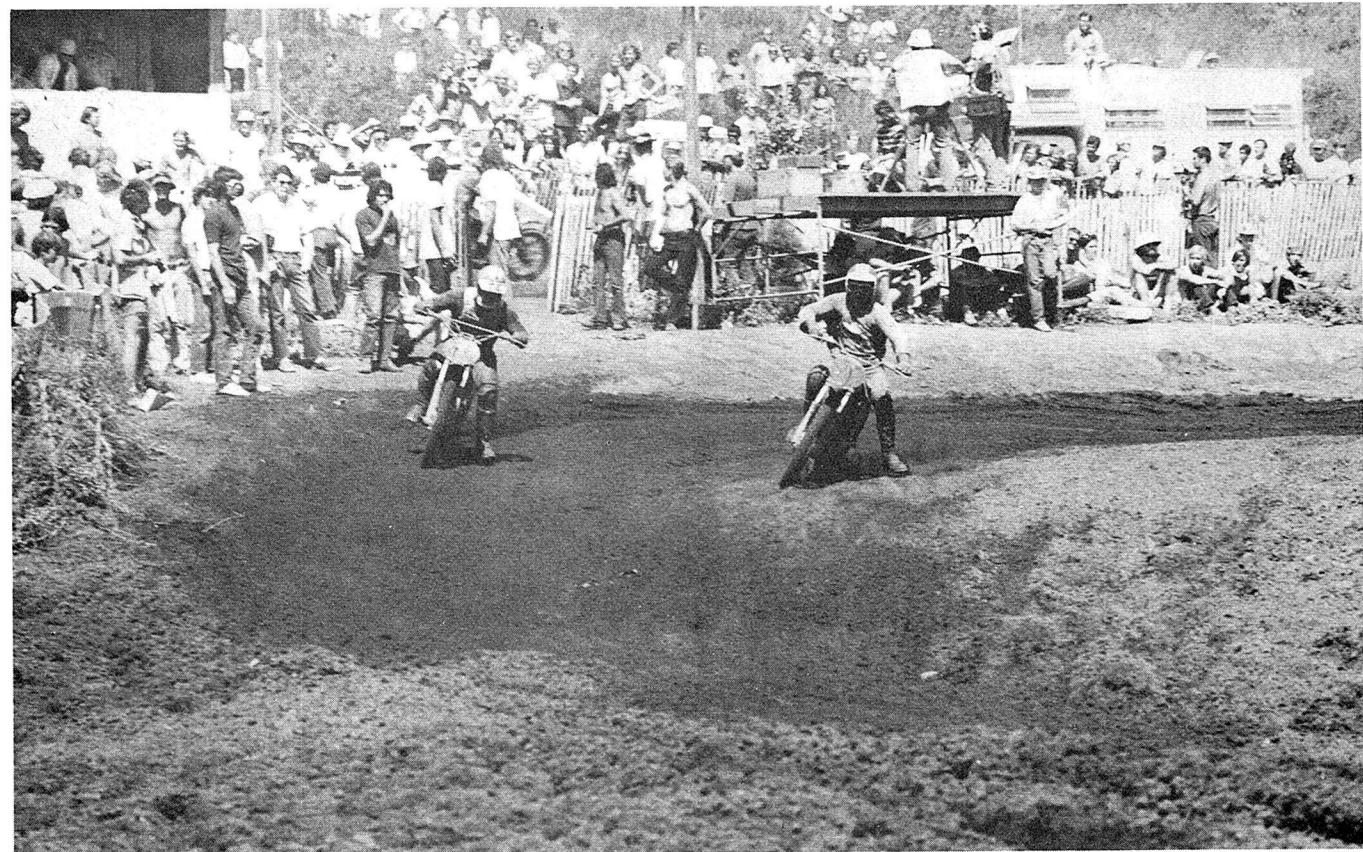


The K&G rider is able to stave off his opponent; simply because he has successfully blocked his line, it is the only practical one on that corner at that time.





On this corner, we watched dozens of riders get passed by competitors on the inside line. Why? The sandy ground enabled the inside man to build a berm and cut inside almost at will. There is no reason to go wide unless a fast berm can be used. When there are berms all over the corner, it makes sense to use the shortest one.





Whenever possible, pass on the outside if you have a choice. Not only is it safer, but it makes the rider you pass alter his line and slows him down momentarily. If you over-cook it on the outside line, you will not cause others to crash; however, go too fast on the inside and you may accidentally run into the man you are trying to pass.

One effective way to pass this sort of dude is to use him as a berm. The technique is as follows: When he goes a tad wide on a corner and you know that he will try to swing in to prevent you from taking the inside line, go to the inside of the corner. Then when he makes his move in toward you, gas it enough so your rear end swings out in a nice graceful arc. This will cut his machine right out from underneath him. Your tire will bounce off of his tire, which will act like a berm and put your bike back in line. This is not a move to be taken lightly; it should be reserved for only the most dire circumstances.

When you do pass a rider, don't back off just because

you are then in front of the man — you might slow down enough to cause his bike to hit yours. Keep the gas on and the momentum up. Remember, that man you just passed is now out to get past you.

If he stays on your tail tightly, after a few laps he will know your intended line, so vary your line slightly from lap to lap. Just enough to keep him from picking a pre-planned spot to make his move. Once he is a few lengths behind, concentrate on getting the next rider behind you. This is generally enough to discourage most riders.

Passing is fun, but it's also tough, tricky and dangerous. Use these basic rules and your task will be made a little easier.

HOW TO SLIDE

Before you attempt to take corners at speed, even if you just want to go sliding for fun, it's advisable to learn your limits. In the process of learning how to slide a bike, you'll most likely spend some time on the ground. Let's get prepared for it.

Before you get started riding, you've got to suit up. Your protective clothing had better be exaggerated. The

more padding you use, the more confidence you'll have.

The first item you'll need is a helmet, naturally. Next, a good set of boots — high boots. If you have an old set of leathers, wear them; not a new set, because you'll probably destroy them.

Don't scrimp on padding. Wherever you think it's necessary, build yourself plenty of cushion. We suggest

Feet on the pegs, at the ragged edge of disaster—
all part of the excitement of sliding.





Even though Valek, the CZ rider, has his machine under a semblance of control, his body and machine are in the incorrect position and he is very close to highsiding. If he were to ease off the throttle even slightly, that would be the end of the ball game.

buying basketball pads for your knees and elbows, which you can get at your local sporting goods or department store.

If you don't have any leathers, wear two pairs of old pants and an old bulky jacket. You should wear a good pair of gloves, too. Buy good ones. Not Torsten Hallman specials or anything like that, because you might tear them up. Just something good but cheap. Sears sells leather work gloves at reasonable prices. They're not the best custom fit, but they'll serve the purpose.

PLAN YOUR CRASHING

Now that you've padded yourself sufficiently, you've got to find a scooter, preferably a lightweight from 100 to 250cc. A heavyweight will do, but it's a lot harder to handle and tends to have a mind of its own.

An old used machine is ideal for the experiment because it'll probably have several scratches and dings before you're through. Make sure it has an adequate

kill button (or compression release if it's a two-stroke), because if you drop the bike very often, there's a good chance that a kinked or displaced throttle cable could stick open on you.

OK, the scooter is ready to go and you've got your body padded sufficiently. It's time to go skiddin'. If possible, find some smooth terrain with a loose slidy surface so you can slide out easily. Later on, after you get used to breaking it loose, you can experiment with different types of terrain.

Start by spinning some low-gear donuts. Take off in low gear, lean the bike over and gas it just enough to make the rear wheel break loose. Keep on until you feel confident with the rear wheel breaking loose under you.

The front wheel will probably feel like it wants to wash out slightly. Let it happen, and follow it along by pawing or sliding your inside foot.

If you're turning right, put most of your weight on



Jim Connolly shows correct body position, well leaned into the machine . . .



. . . and the steeper the slide, the more Jim leans into the bike. Body weight is kept well forward.

your left peg, using your right as a stabilizer on the ground. Put very little weight on the foot that's on the ground. It can catch and throw you off balance, which usually results in a get-off. In racing it'll slow you down, because your foot will work like a brake if you apply much weight to it.

By the way, while you're practicing these donuts or any other type of cornering or turning in the future, don't get hung up on turning in one direction. This is easy to do. Most of us feel more at ease turning in one direction. We've heard that right-handed people feel better in left-handed turns, and vice-versa.

Whatever your preference, forget it. You should alternate left- and right-hand turns.

Take flattrackers, for example. Unless they practice away from the track, they get in so strong a habit of making left-hand turns that they feel awkward making right-handers in some other type of racing.

Practice donuts for a while to gain confidence. When you feel you've mastered this sufficiently, wind it up in low gear, lean it into a turn and lay it down. Pull the bike down with you and assume the down position we talked about before. Do this several times until you can readily assume a comfortable position while sliding out.

When you feel you can fall comfortably at this speed, shift to second gear and go through the same procedure. Keep yourself tucked into the bike and keep a good grip on the bars. Don't let it get away from you.

It's sometimes hard to hang on with both hands, but at least hang on with the top-side hand. If you don't keep the front end in tow, the bars will give you a beating. Besides, you can damage your front fender and controls.

If you can sit high center on the bike while you're sliding, this position will give you good control. Besides, if you slide out, you're sitting on the bike instead of the bike sitting on you.

When we say high center, we mean not to lean all the way over with your bike. Let the bike lean and hold yourself in a somewhat erect position. This way you have a chance to throw your body-english one way or another to compensate for what the bike is doing.

Also, if you sit high center, you can readily assume the down position. You'll be sitting on the bike as it

slides out, whereas if you lean low with the bike and it slides out, your inside foot (the one on the ground) usually gets caught underneath as you go down. This position makes it hard to hang onto the bike, and it'll bounce up and down on your leg, sometimes breaking bones and almost always scraping off some skin.

As you slide out in your high-center position, it's ideal if you can keep the sole of your inside boot on the ground. This isn't easy to do. Your foot can catch, and you'll end up sliding on your knee. This is why we recommend ample padding.

If you can keep your foot on the ground, you're in a squatting position, with your hand gripping the throttle and keeping the engine running. When the bike slides to a stop, you can immediately stand up and get on your way again. This can save you valuable time if you're in a race.

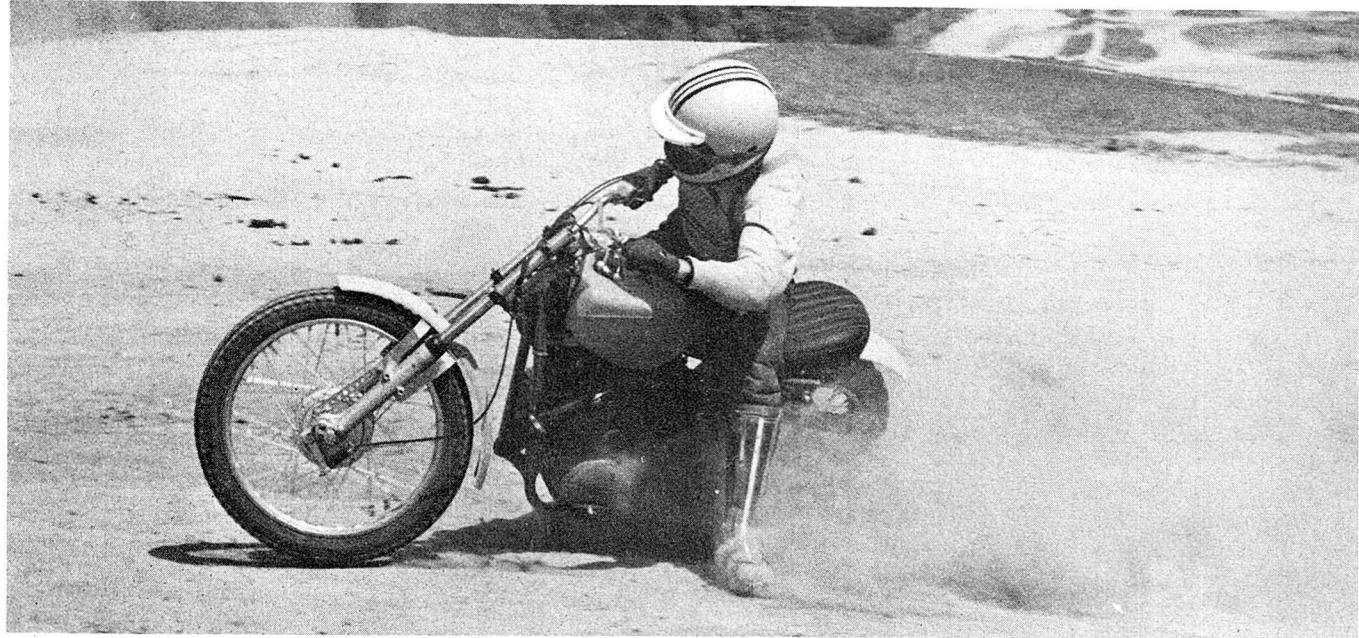
The sliding-out procedure may seem like a reckless way of practicing, but we think it's necessary to learn what to expect when you fall. That way you're not



Failure to keep the foot forward can cause it to be rudely yanked back and cause loss of control.



Same rider, same turn, but with the foot in the correct forward position. This time, a properly controlled slide.



Here, Jim lets his foot get dragged back, causing the bike to get slightly upright in the process.



Another pass in the right attitude produces a picture-perfect slide.

taken by surprise. This doesn't mean you should continue this practice for a great length of time — just until you've found the limit of adhesion and how to react when you go past it.

Up till now, we've talked about one way to fall: sliding out or falling on the inside of your turn. Another way of falling while cornering is called "highsiding." Those of you who are familiar with it know there's no way to practice for this type of fall, except maybe to jump off the roof of your house head first.

In this case, you fall, or are pitched forward, ahead of the bike. This type of fall at speed usually inflicts serious damage to the bike—unless, of course, the bike lands on you. If the fall hasn't injured you enough already, the bike will finish the job. To avoid highsiding while sliding through a corner, you either keep the bike low or the throttle on.

FOR TT AND FLATTRACK RACING, you pitch the bike sideways going into a corner in order to slow down and get set up for coming out of the corner. This is called brake sliding. Since you're decelerating, the tires want to bite. If they get enough traction, over the highside you go.

That's the reason for keeping the bike low and leaned over so there isn't enough tread on the track to keep the tire from sliding. When you want to come out of the brake slide, gas it evenly and at the same time bring the bike upright, so that you might go smoothly from a brake slide to a power slide.

In desert or motocross racing, try to keep from sliding as much as possible. If you do slide into a corner, it's usually in a somewhat upright position, due to the rough terrain.

In this case, you've got to keep the throttle on, both

Even the best get the rear end out too far at times.



Under the right conditions, the front wheel slides very little and remains tracking, while the rear end moves all over the place.

coming in and going out of the corner. Throttle on means keeping the engine revved up enough to keep the rear tire breaking loose and allowing the bike to slide. Shift your weight forward. Sit on the tank if you have to, in order to take the weight off the rear wheel so it can break loose readily.

When you're through the corner, shift your weight back so the rear tire gets more traction, and make your exit. Remember, if you shut off in the middle of one of these upright slides, you're almost guaranteed a highside.

Now that we've gone over some of the do's and don'ts



of sliding and cornering, pick some different surfaces and *practice*. Since you started your exercise dwelling mainly on sliding corners and falling, don't necessarily concentrate on this. This was to find your limits of traction and how to fall, if it happens.

You should continue to practice, trying not to slide any more than you have to. Try to get all the traction possible, and concentrate on gaining ground.

You can experiment while playing, but make sure you have it all together when you "Put your best wheel sideways" on the track.



You should slide into a berm, not attempt to slide up on it.

HOW TO CRASH GRACEFULLY



If you find that you are going to take a trip over the bars . . .



. . . tuck your extremities in and roll with the impact. An outstretched limb is likely to be injured.

Dirt riding is a satisfying and pleasurable hobby enjoyed by thousands of people all over the world. There is a great deal of camaraderie among dirt bikers that is similar to the bond that any group of people with like interests share. But our bond is on more of a gut level than most, simply because of one fact: we all crash.

Lordy, do we crash: over the handlebars, under the handlebars, lowside, highside, into trees, through bushes, into cliffs, off cliffs, and through rocks, trashcans, and porta-cans. And the fact that we occasionally have trouble keeping our machines upright scares many potential riders away, but it shouldn't. If a dirt rider takes the proper precautions, his unexpected spills need not be as painful as they often are.

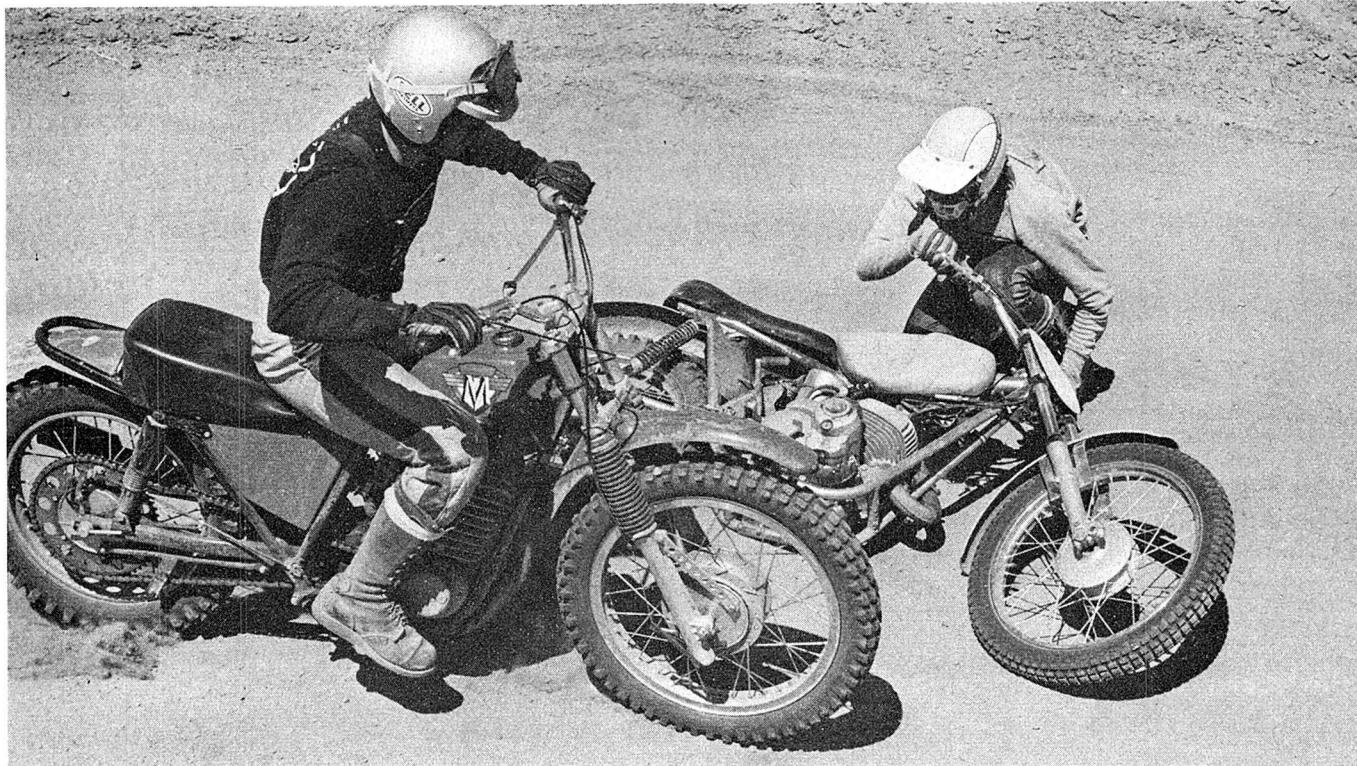
Such precautions involve machine preparation, the rider's physical condition and protective gear, and knowing what to do at that magic instant when he knows he's going to eat it, for sure. Let's look at each of these items and see if we can help make your next spill something that you can joke about with your pals, instead of having to explain it to a disapproving emergency room attendant.

MACHINE PREPARATION

Every dirt rider is after the "trick" setup for his machine. Mostly, he's looking for speed and dependability, but there is also a trick setup for safety. Motorcycles have many potential bod-busters on them that usually seem harmless until you're tumbling head-over-heels, closely pursued by your bike.

Footpegs should have reasonably smooth contours and be of the folding variety. Some pegs are shaped like bayonets and can cause serious puncture wounds. Others become dangerous only when the rubber cover is missing, which is usually always. Rigid footrests should be replaced by units that fold when a rider's ankle is trapped between it and the ground or any other unyielding object. Folders have the additional advantage of eliminating a potentially dangerous weapon, because they are likely to retract when the machine is skidding along the ground, headed for its hapless rider.

Clutch and brake levers should be replaced if their ball ends are broken off. Smaller control levers should be positioned so that their protruding parts are tucked behind the handlebar in a position that keeps them



Use your bike to protect yourself from oncoming riders from either side . . .



. . . or from the rear. Your fallen machine can be good protection. Many riders have not been injured from a fall, but then get seriously hurt from somebody riding over them.

out of harm's way. Broken or poorly positioned levers are especially dangerous in over-the-handlebar crashes or when several riders go down in a pile.

Many riders install padding on their handlebar cross-braces to prevent mouth injuries when negotiating rough terrain using the "Flying W" technique. The foam insulation that air-conditioning and refrigeration people use to insulate piping works swell. It can be attached with duct or filament tape, or if you want a more sanitary job, use plastic tie-ties.

One of the weaker safety points on most dirt machines, especially all-out racers, is the exposed chain. All bikes should have some sort of chain guard, no matter how small, to help prevent riders' fingers or hands from tangling with the chain and sprocket. Unfortunately,

most machines are severely lacking in this area, but a conscientious rider will want to fabricate some sort of guard around his drive chain. Special attention should be paid to the bottom chain run, because the forward motion of the chain tends to draw interfering objects into the rear sprocket, which is the most accessible, and thereby the most dangerous of the two.

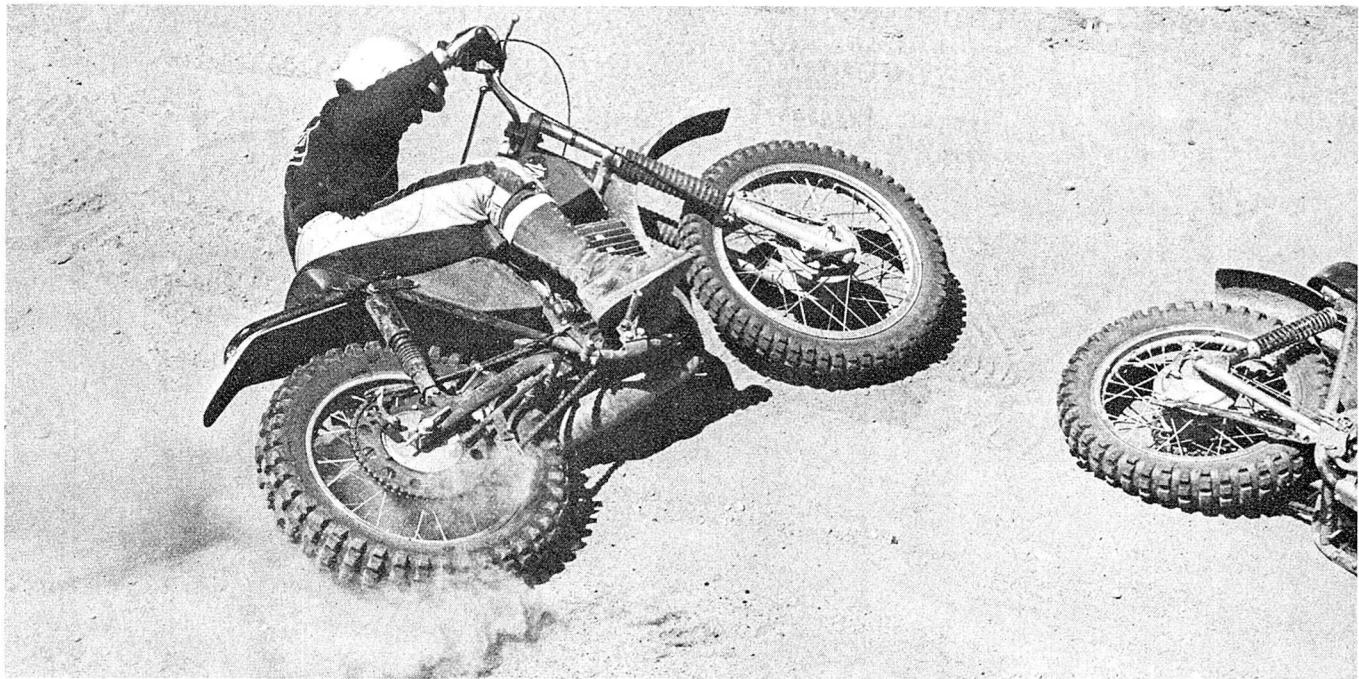
Trail riders with dual purpose bikes should tape up their headlight lenses to keep broken glass from adding to the hazards of a spill. It would probably be a good idea to remove the turn signals if your machine is so equipped.

Take a look at your machine and try to find problem areas that might cause injury in the event of a spill. Look for subtle items that could hurt you under crash conditions. Almost any item that protrudes can be a troublemaker. One of our staff members even gotched himself with his DTI's ignition key.

RIDER PREPARATION

Protective riding gear, or a lack of it, is one of the most important factors determining the severity of injuries suffered in a crash. But what is under the clothing can be equally important. A rider who is in good physical condition can endure a spill that would send a flabby rider to the hospital. This doesn't mean that you should run down to your local sporting goods store and buy a set of barbells. In this case, actual brute strength is not as necessary as simple muscle tone. If you're a reasonably active person who enjoys sports that tax your body, then you should have good muscle tone, providing, of course, that you don't live on enchiladas and cheeseburgers. Tennis, bicycling, and hiking are great sports for keeping in shape; dirt biking is the best.

As far as equipment goes, it's unnecessary to mention



If you cannot avoid hitting a downed machine, laying your machine down is the safest bet. Let the bike take the punishment.

the value of wearing boots, helmets, and leathers. There are a number of other items that are also valuable in keeping bone and sinew together in a spill.

Mouthguards, like the Jofa, keep rocks and birds out of your teeth, but also provide good protection when going over the bars. They also protect your jaw in case of contact with the handlebar cross-brace. Some riders prefer to use the football-type helmet-mounted face guards. If you want to go this route, buy the plastic kind that is designed for motorcyclists rather than one that has a metal core. The nylon used on this guard is more resilient and less likely to transmit sudden jolts to your neck.

How many times have you seen some dum-dum out riding on a motocross course wearing only a tee-shirt? Quite often, I bet. Next time you see this guy, he'll probably have giant strawberries on both elbows. Smart riders wear a long sleeve sweatshirt or jersey. Most jerseys can protect your arms, shoulders, and back as well as a leather jacket, with the advantage of being lighter in weight and cooler in hot weather. Perforated nylon jerseys offer the best protection, especially in the summer. Whatever you choose to wear, make sure that it has long sleeves, and is reasonably tear-resistant.

Gloves are an item that are very easy to take for granted. Any kind of glove is better than none at all, but the best for all-around dirt riding in warm weather are the ribbed motocross gloves. The padding on the back of the fingers cushions impact from tree branches, cactus, etc., and prevents the wearer's fingers from being pinched between the control levers and grip if a spill drives the handlebars into the ground while the rider's hand is still attached.

There are enough items on the market that are designed to protect a dirt rider's body that he can dress like a hockey goalie, if he wishes.

THAT MAGIC MOMENT

So much for the precautions that you can take up

front. What you do at the magic moment when you realize you're going down is equally important. There are several ways that guys go down, and each one should be handled in a slightly different manner. We'll tell you what to do when that sickening realization comes, and hope that you'll be able to remember in the split second that you have to act. Some things require a lot of practice before perfection is achieved; crashing allows us precious little margin for error, and it's best to do it right the first time.

THE HIGHSIDE

Hightiding occurs when the rider fails to keep the power on during a slide, hits a berm incorrectly, or meets an unexpected obstacle in a corner. This type of accident is responsible for most of the dislocations, shoulder separations, and upper torso injuries that occur during serious or play racing. The rider is usually flung off the machine in the same direction that he is traveling. In cornering, that means that he goes over the bars diagonally. Sometimes his machine will follow him and add injury to insult. The best plan seems to be to tuck up and roll free from your bike. Push off from the machine if you have to, because it's probably coming after you. When you hit, make sure that your arms and legs are tucked in. Don't put your arms up to protect your head, your helmet will take care of that. You'll hit hard because the nature of the crash will whip you over the bars. Remember, hit the ground, and roll out of the way of your bike, quickly.

LOWSIDE

The lowside is probably the most common type of spill, and is relatively safe unless you're riding the Sacramento Mile. Lowsiding is simply sliding out while cornering. It can cause hip, arm, and lower leg injuries, but most commonly only results in bruises and hurt pride.

If you're cornering with your leg out and go down,

you'll land on your butt. Problems occur because the bike is usually traveling at a decent rate of speed and spins around when it hits the ground. If your leg is caught between the bike and the ground, it can be a very painful experience. Try to keep your leg out from under the machine by making a conscious effort to lift it out of the way when you're halfway down. You will be thrown clear of the bike, and since it is traveling in the same direction in front of you, there is little chance that you'll get tangled with it. If you find yourself sliding along the ground, and if you're sure that there is no one behind you, try to spread-eagle a bit to slow down and spread the impact over a larger part of your body. Getting stopped is very important if there is a fence or retaining wall on the outside of the turn.

When the lowside occurs during a race, in traffic, it is usually best to stick with the bike to give your pursuers more room to avoid you, or to use the machine as a shield in case a secondary crash is inevitable.

OVER THE BARS

A great many things can cause you to go over the handlebars of your motorcycle. It may be an immovable object, a front wheel landing on a jump, loss of control over whoop-de-dos, or anything else that causes the bike to stop abruptly or raise the rear end quickly. This is the popular "endo," an expression that has been perverted by bench racers to describe almost any spill, no matter how small.

The very nature of this type of spill makes it a good bet that your bike will come after you. That is, unless it's stopped by a large immovable object. In this case you'll probably have more to worry about than a collision with your machine. The endo is a violent crash, and consequently puts the unfortunate victim at the mercy of the various forces controlling an object in motion. Some riders claim that the best way to avoid injury is to remain loose and relaxed when you leave the machine. We can't go along with this theory, because it is virtually impossible to keep

When low siding the bike, get legs and arms out from underneath the machine and hang on until it comes to rest. Then look around quickly to check for oncoming traffic.



your body loose after wrestling with an out-of-control motorcycle. Every muscle in your body becomes taut and tense and you're literally scared stiff.

Again, as with any crash that hurtles you through the air, tuck up, tauten your muscles to provide better protection from impact, and try to spread the landing and tumbling forces out over your body. In other words, put both arms up to protect your chest so the impact is spread over both forearms. If you find yourself tumbling, arch your back, or dig your heels in to slow down. You're less likely to break bones if you slide into a rock or tree than if you roll into one.

There are so many varying circumstances under which crashes occur that in any crash, especially a high-speed endo, it's hard to say what to do for sure. Rocks, trees, cactus and other obstacles make defensive action somewhat difficult to predict. Luck and good protective clothing usually determine the outcome of an endo, but a quick-thinking rider can supplement these factors with a good knowledge of how to meet the ground gracefully.

UPHILLS

When you're climbing a hill and start to loop, try to ride it out until you're slowed down as much as possible; then get off and roll or scramble off to the side of the trail. The bike will be coming down hard, so stay clear.

If the bike simply slides out, it will dig into the side of the hill enough to keep it from coming back down on top of you, unless it is a very steep hill. But it's still a good idea to stay clear.

When the rider rolls down the hill, his chances of being injured are increased. Dig in or grab a firmly planted object to stop.

DOWNHILLS

A downhill spill is much the same as the endo because so much weight is on the front of the bike that it will flip over under circumstances that would normally only induce a minor fall on level ground. After



When you see that you cannot make a hill and are about to dump the bike, dismount quickly before the bike falls . . .

going down, the bike will probably have more momentum than its rider and continue sliding downhill ahead of the rider. There should be no problem unless the rider goes directly over the bars. Then a quick prayer would be in order. In a downhill endo, there is less time to act than in a similar level ground situation because gravity will cause the bike to chase you more quickly and for a longer distance. All we can say is get out of the way fast. Contact with a hurtling motorcycle is more likely to cause injuries than a simple hit the ground and tumble. Downhill crashes and endos, probably sell more full-coverage helmets than multi-dollar advertising campaigns.

CRASHING IN TRAFFIC

Some of the worst accidents happen during a race when there is a group of riders bunched together. One rider will go down and all of a sudden there is a chain reaction, and the course is littered with tumbling bikes and racers. You may find yourself either the first one to fall, or in a situation where everyone around you is crashing. Here's what to do in either case.

If you go down and know that there are bikes behind you, try to make yourself as small a target as possible. Don't just lay there on your back and wait for someone to administer the *coup de grace*. Tuck in and try to put your fallen machine between yourself and the oncoming traffic. Let the bike take the impact of a secondary crash.

Don't try to run to the side of the track unless you're sure the coast is clear. With all the dust and confusion that usually surrounds a spill, there is a good possibility that you'll be centerpunched by another rider.

Many times you will be riding along in a motocross or cross-country race when a rider or riders next to you will start the wild gyrations that usually precede a crash. When this happens, gas it and get in front of all the confusion. Don't change your line unless you absolutely must to avoid getting tangled in the mess. There may be other riders next to you who are also fleeing.

Another uncomfortable situation that is quite commonplace occurs when a rider or group of riders goes down in front of you. If the track is wide enough, you can simply motor around the grief. The first thing to do is look for an alternate line. You may be going too fast to change direction quickly, or the track may be completely blocked. In this case, jam on the binders as hard as you can to slow down quickly.



. . . and attempt to lay the bike down gently on its side.



... roll when you land to get clear, then spread-eagle your body to stop the rolling.

Then, at the very last minute, lay the bike down. It's amazing how fast a bike will stop when you lay it down gracefully. The important thing, in this case, is to reduce your speed as much as possible. If a collision does occur, the slower you're moving, the less serious it will be.

Unfortunately, there will come a time when you will have to hit a downed bike or rider (Gad!). Hang on to the bars to prevent them from being wrenched from your hands, and proceed as steadily as you can. Remember, your motorcycle doesn't know that a fallen bike is anything but another sudden jolt. It may sound heartless, but that's the way you have to treat a fellow rider to keep from crashing yourself. Naturally, you won't want to use a bike or rider for extra traction. Steer over the obstacle as gingerly as you can while still retaining control over your bike. But perfect the panic stop and you will be able to avoid many sticky situations.

When the time comes that you go down in a pile with other bikes and riders, keep your arms and hands

Try to keep from falling, but if you can't . . .



close to your body to prevent them from getting caught in a spinning wheel or chain. Again, use a bike for a shield against oncoming riders who might be unable to avoid the mix-up.

CONCLUSION

We've approached the subject of crashing from a purist's point of view. But most spills are complicated by the fact that the rider will do everything in his power to keep from going down, and usually get extremely out of shape doing so. Crashing gracefully is just as much of an art as riding fast. Riding experience helps, that's why expert riders suffer fewer injuries than beginners, even though they are usually traveling much faster.

The human body is very durable. Wearing the proper protective gear, tricking out your machine for safety, and knowing how to fall properly will keep you from having to test the limits of its durability.

HOW NOT TO WIN AT RACING



Now that we've taught you how to win at racing, let's see what will guarantee you to lose at racing. There are a lot of very fast riders around who will never be winners, because they defeat themselves. They take all their natural skills and burden them down. How?

Many ways. But the most common is the old get-bombed-before-the-race bit. There is no way a good rider is going to operate at peak efficiency, if he gets smashed the night before. Not only does it take something out of you physically but, more importantly, it kills the desire to win.

While that gallon of Red Mountain wine seems neat-o the night before the race, the morning after

brings cotton mouth, early fatigue, a splitting head and a desire to spend the morning perched over the john like a diarrhetic buzzard. Reflexes are also dulled, slowing reaction time down greatly. After 10 minutes of racing, your mouth feels like Wilt Chamberlain has been storing his dirty basketball socks in it and the entire Russian army has been marching across your tongue with ice skates on. At times like this, all your mind is on is a cold drink of something, and you want to get the race over with as soon as possible.

Drinking too much is not the only thing that can slow the old bod down. Six dollars worth of Grungitos Red-Flame Tacos will make the stomach protest violently. Barfing in a full coverage helmet is no picnic,

believe me. Even a full stomach can make the big bumps much bigger than they really are.

Riders should eat light before a race. High sugar foods that digest easily are the rule. Avoid heavy breakfasts like pancakes; that old stick-to-the-ribs bit doesn't really hold water. Oranges, dried fruits and the like will give you lasting energy, without bloating up.

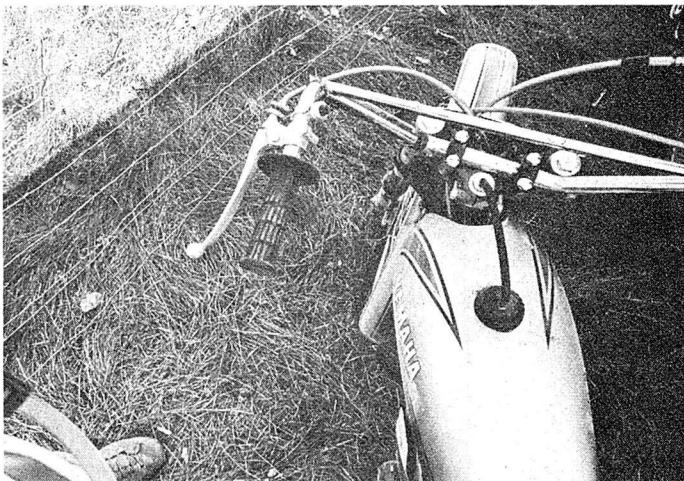
Another good way to be a sure loser, is to get as little sleep as you can. Sure, you're young and strong and that card game with the guys is fun, but racing will drain all the energy you have, plus all you have in reserve. If it doesn't, then you're not really trying. Even the best racers in the world, like Robert and De Coster, are absolutely wasted after a day's racing.

One small, indelicate point must also be approached. Er, ah . . . sex. Don't try to double the human race the night before. This is not a plea for total chastity or anything as radical as that, but like all things, moderation is the way to go. If at all possible, hold off the orgy until after the races are over. (Wash mah mouf out wif soap!)

Other things that will insure your non-success are common. Among them, blowing a lot of nervous energy. Stay calm. If you're the nervous type the night before a race, try to get your mind off of it. Go see a movie—not "On Any Sunday." That'll get you so psyched up you won't be able to sleep for a week.



Failure to watch out for deep ruts will give you a different view of racing.

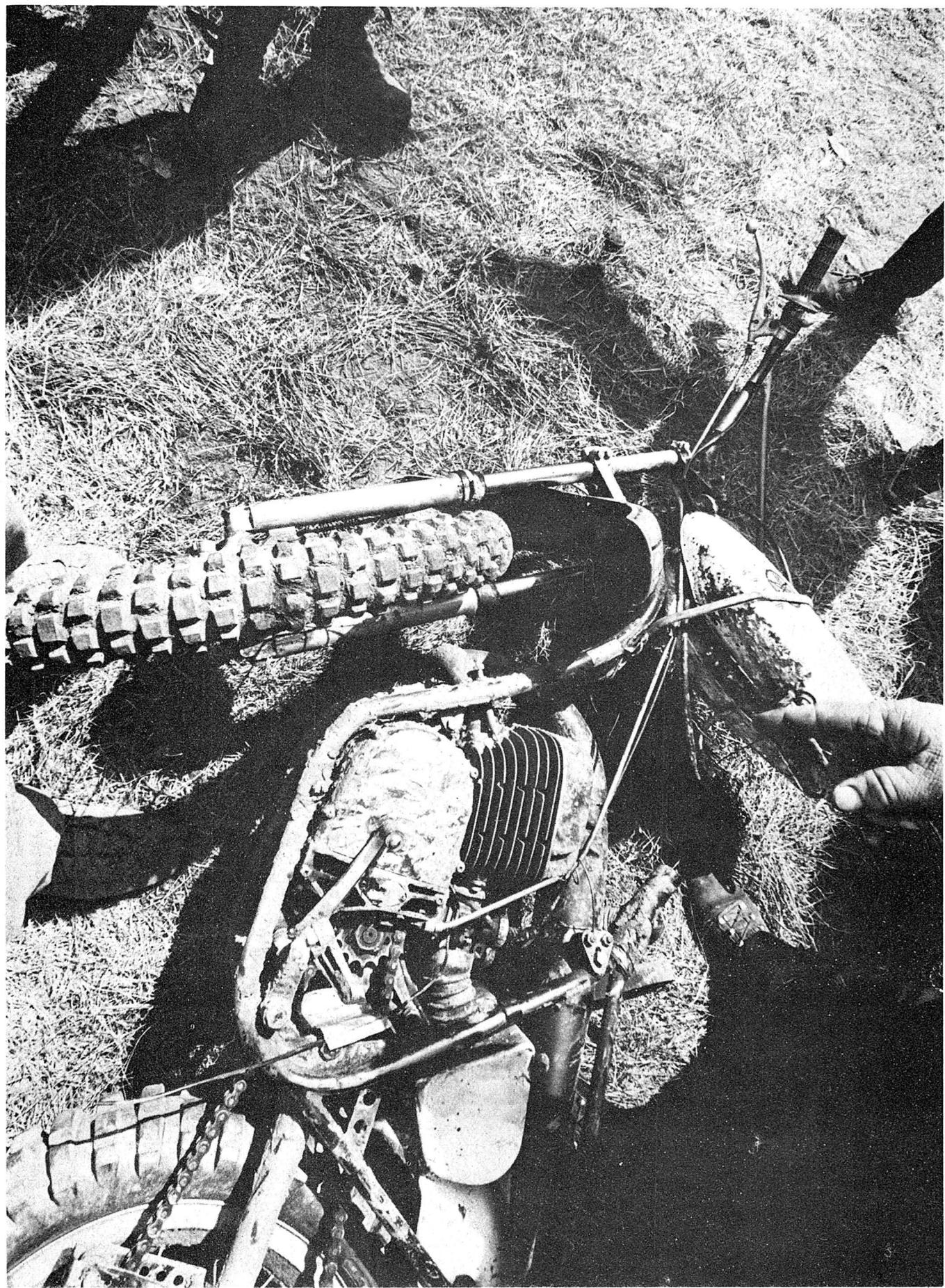


Not paying attention can insure things like riding into a fence, one of the best ways NOT to win at racing.

If you're a smoker, keep the huffin' 'n puffin' to a minimum. Better yet, just chew on a Jet Bomber cigar—don't light it.

Aside from the physical, you must put a heavy accent on machine preparation. Unless that bike is race-ready, chances are you will not finish.

Don't try to do your maintenance the morning before the race. The rider who tries to service his air cleaner at the track stands a good chance of having a bunch



One sure way not to finish, is to cut and weld the frame of the bike several times — until it's almost glass-like.

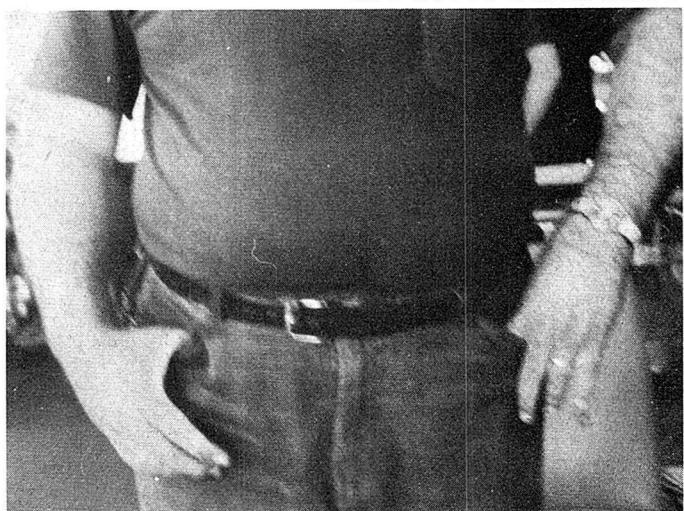
of dirt end up in his carb—from riders passing by and stirring up the dust, if nothing else.

Yes, you always find these riders at every race. You know the kind—15 minutes before their race, they're running around frantically searching for parts . . . "Hey man, you got a B7E I can borrow?" or "Any of you guys got a spare tube, any size will do?" or "I left the float bowl for my Amal on my work bench, you wouldn't happen to have a spare, would you? I'll return it right after the race." Uh huh. Sure you will, buddy.

I even had one come up to me and ask to borrow my whole tool kit, so he could pop in a new piston. Seems he seized up the bike a few days back and just never got around to repairing it. This dude will probably poke out his wrist pin with a piece of rusty old plumbing pipe, gap the rings with his fingernail, and tighten up the head bolts with a monkey wrench.

Another approach to not winning is to come late to the track and miss practice. How are you going to compete with others on an equal basis if you don't even know what the track conditions are like? Take the time to get all your stuff ready to go properly, but don't let it make you late.

Funning around with your pals between motos or heats is great, but if it distracts you from your purpose, winning, cut down on the horseplay. The same thing is true of a rider's relations with his girl at the track. A smooch or two between races is good for the head, but don't get going too hot and heavy, because if you have to make a decision between sex and racing . . . sex will win.



A good beer gut is a must to keep you out of the winners circle. Cultivate one today.

When you finally get out on the track in actual competition, *concentrate*. Sure, it's neat to check out the spectators and wave at the girls and pull a neat slide for your friends. But the theatrics won't earn any trophies. Concentrate on your technique and line.

Outside pressures also can contribute to a poor performance at the track. It is a real hassle if you have financial or marital problems, but leave them at home. Hell, you go racing to have fun, right?

You should be getting the message by now of how *not to win at racing*. It's very easy, just read everything in this book, and do exactly the opposite. *



Whenever possible, try to go the wrong direction on the course, preferably on your side.

HOW TO KISS THE TROPHY GIRL

(You Devil You)

